May
1961

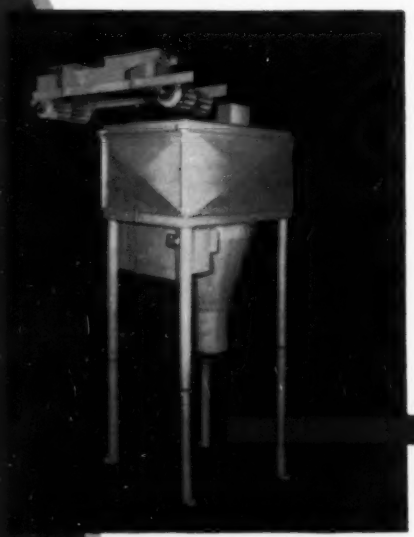
COMMERCIAL FERTILIZER

and PLANT FOOD INDUSTRY

THE ADVANTAGES OF
20% SUPERPHOSPHATE
IN MIXED FERTILIZERS

SEE PAGE 19

Advertisement of Nitrogen Division, Allied Chemical Corporation



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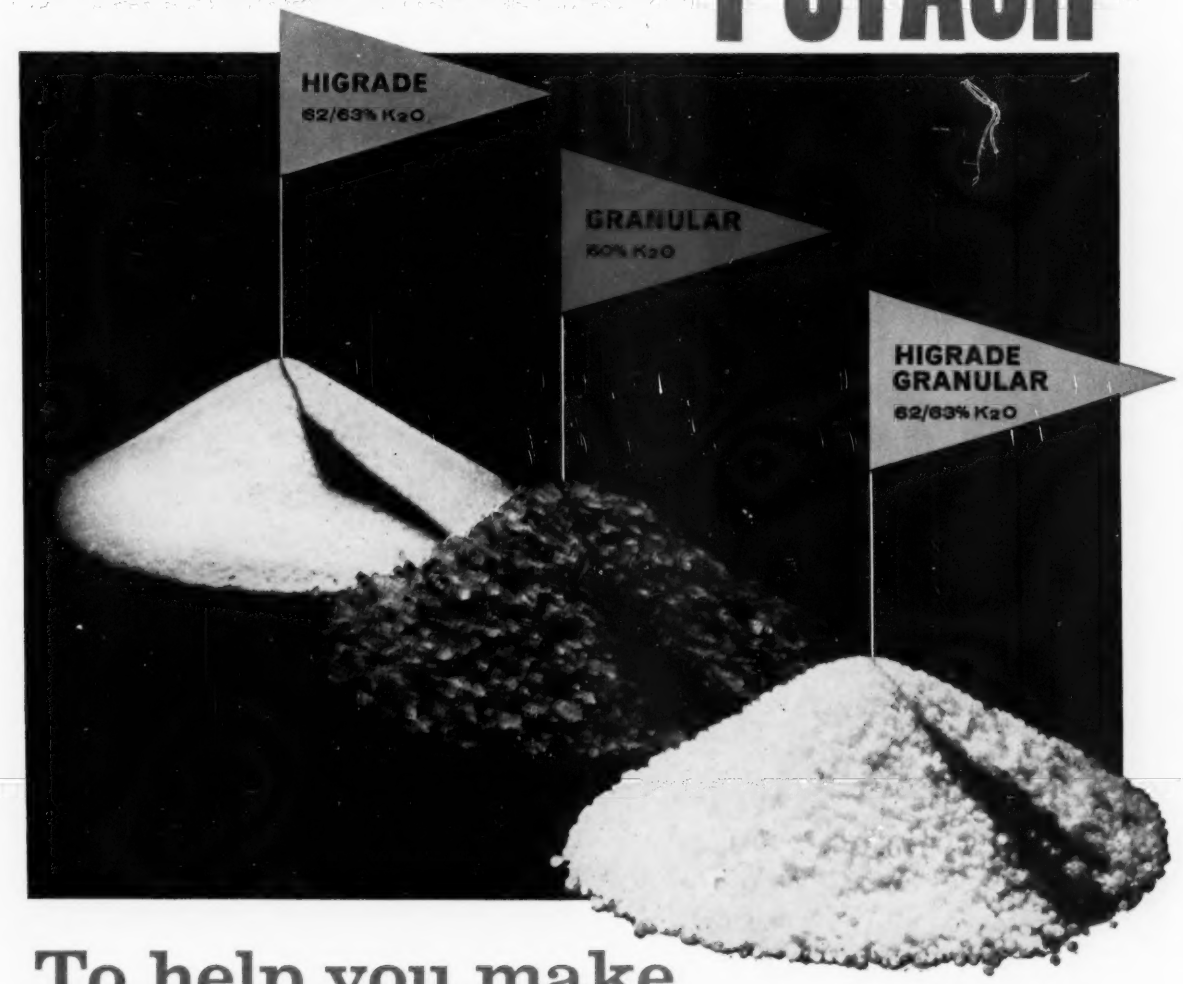

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COMMENTING FREELY

by

Bruce Moran

People just naturally worry, I suppose. If things look rosy they still search for something to beef about. This is suggested by a clipping which recently came to my desk. Or rather part of a clipping, for it started out "Not every side of the fertilizer situation is rosy, however."

We knew of course that the population explosion guarantees the long range picture for our industry. We knew that reports coming in from the field covering the first quarter show "Sales better than forecast . . . March is running 10% ahead . . . well ahead of last year . . . think industry sales will top $1,220,000,000 (last year's figure) by 10%.

But the worry was this: Will there be enough freight cars and trucks to haul all this heavy tonnage?

People will be people.

COMMERCIAL FERTILIZER and PLANT FOOD INDUSTRY

Vol. 102, No. 5 May, 1961

Established 1910

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Balancing maximum strength with economy is a delicate operation. Kennedy multi-wall bags in a wide range of specifications, include one best suited to your needs and budget. Our engineers can help you select a standard bag or design a special bag to meet your requirements. ■ **Other Kennedy products include**—Zip-Lip reclosable poly bags for sampling and small packages, plastic and paper bags and products, car liners, printed roll stock and flexible packages of all kinds.

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or valve construction
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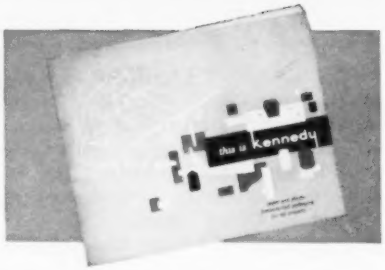
"This Is Kennedy—" a well-illustrated brochure, describes the plant, products and people who can work for you. It's free—ask for a copy today.



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A-8

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See Sohio first for high quality anhydrous ammonia—aqua ammonia—coated 45% or uncoated 46% urea—and 18 nitrogen solutions, including those containing urea. You want it—we have it.

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Agent for Solar Nitrogen Chemicals, Inc.

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Phone CApitol 5-8015 or wire (TWX call letters LIMA O 497-U)

SANTA CLAUS, apparently, is not as completely immune as he used to be - to judge by the reactions in Congress to some of the more benevolent Kennedy projects. Our legislators had a chance to get with their constituents during the Easter period, and they seem to be reflecting grass-roots conservative ideas.

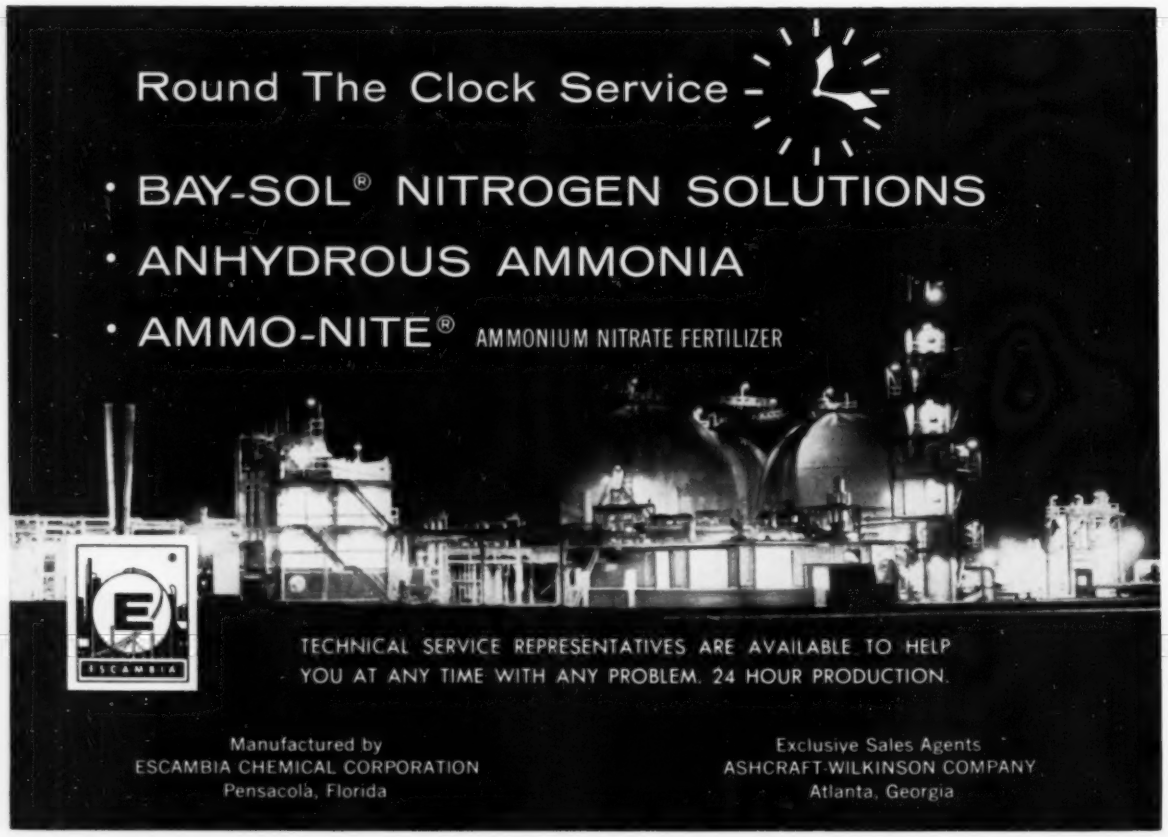
MADISON AVENUE is coming into play in an effort to correct all this. There will be a heavy merchandising type campaign, using the major advertising media, to loosen up the public - and thus loosen congressional purse strings.

AIM IS to grease the ways for next year. This year is so nearly over the dam that there is not too much hope of passing many of the "New Frontier" legislation. So when Congress goes home again they will find their constituents under bombardment from the Great White Father.

WHAT DEVELOPS then is in the lap of the gods and Madison Avenue.

Yours faithfully,

Vernon Mount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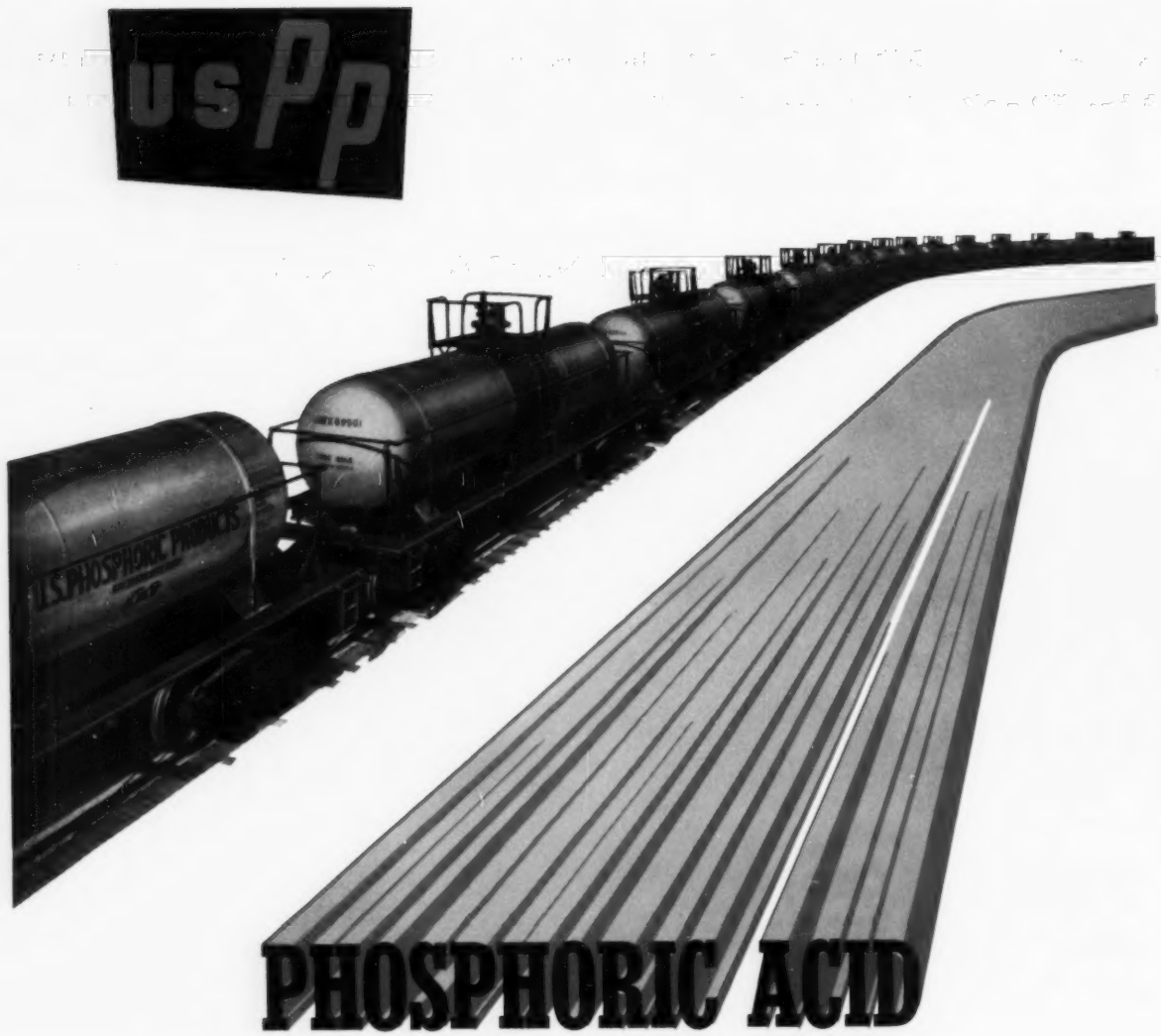

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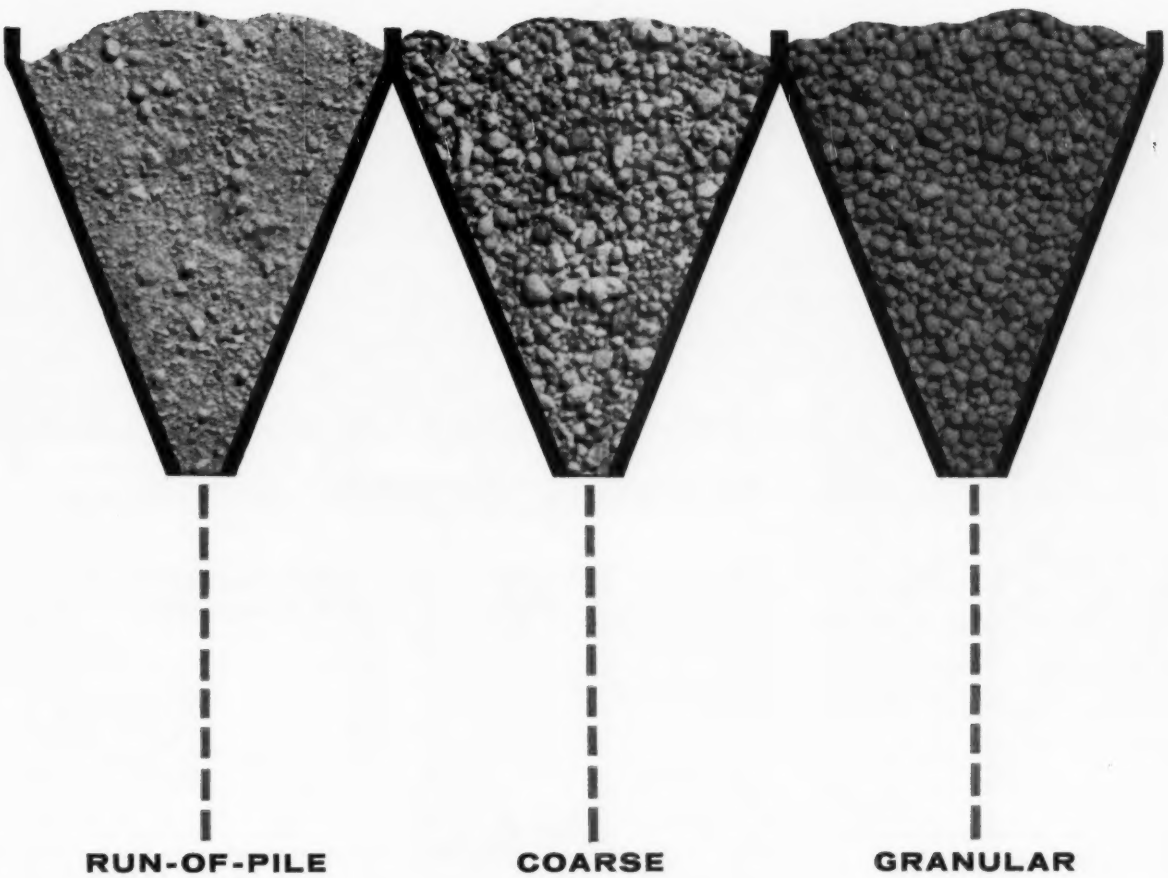

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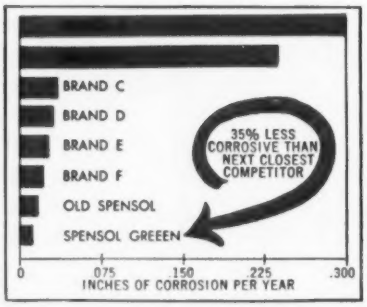
A veteran fertilizer firm, Carroll Fertilizer Company began selling to Georgia farmers in 1927. The building shown above houses their facilities for manufacturing popular grades of mixed fertilizer such as 4-12-12 and 5-10-5.

34-Year-Old Carroll Fertilizer Company Uses Non-Corrosive SPENSOL GREEEN* Solutions

Since beginning business as a fertilizer dealer 34 years ago, Carroll Fertilizer Company has expanded its facilities to include manufacturing, storage, sales, and application. About 75% of their MO-CROP brand mixed fertilizers production is used on row crops and 25% goes on pastures. Carroll Fertilizer Company also features Spencer's popular URA-GREEEN solution as supplemental nitrogen for direct application.

Manufacturers of long experience, these experts know the importance of corrosion control. They protect their valuable production and storage equipment by specifying genuine SPENSOL GREEEN Ammoniating Solutions. Thanks to its advanced corrosion inhibitor, SPENSOL GREEEN gives you far greater corrosion protection than any other competitive solution (see chart at right) . . . yet it costs you nothing extra!

Why risk costly corrosion damage? Extend the life of your equipment beginning now by making your next order SPENSOL GREEEN. Contact your Spencer representative now for prompt delivery!



See how you can cut costly corrosion damage when you switch to genuine SPENSOL GREEEN—as proven by the laboratory test results shown above.

*A registered trademark of Spencer Chemical Company.

Insist on **SPENSOL GREEEN**

NON-CORROSIVE AMMONIATING SOLUTIONS

SPENCER®

Spencer Chemical Company
Dwight Bldg., Kansas City, Missouri

Sales Offices: Atlanta, Ga., Chicago, Ill., Memphis, Tenn., Omaha, Nebr., Kansas City, Mo.
Works: Pittsburg, Kans., Henderson, Ky., Vicksburg, Miss.

How Union-Camp's 5-Star Multiwall Plan increased a pallet payload by 400 lbs...without increasing its size!

A leading supplier of high density resins* had been packing his product in 50-lb. sewn-bottom multiwalls. This gave him an efficient, 40-bag (2,000 lb.) pallet load.

When he added a *low density* resin to his line, however, he found his existing bag wouldn't accommodate 50 lbs. of the new resin due to its increased volume. A slightly larger, sewn-bottom multiwall was tried, but this reduced the pallet payload to 32 bags (1,600 lbs.). Net "loss": 400 lbs. Net result: more handling . . . more trips to the warehouse . . . higher cost.

Heightening the pallets to 10 tiers instead of 8, offered no solution—they wouldn't pass through the existing archways. To say nothing of the problem of loading trucks and trailer cars.

New bag does the trick

At this point, the 5-Star Packaging Efficiency Plan went to work. Union-Camp multiwall specialists experimented with several different bag sizes and styles. Their solution—a multiwall with a *pasted* bottom and side gussets, a *rectangular*-shaped base—and 20 per cent more capacity!

With the new design, 50 lbs. of the low density resin can now be packed in each bag. Most importantly, the pasted bottom bags can be palletized five to a tier, eight tiers to a skid for a total payload of 2,000 lbs.—the same as the high density resins.

Warehouse space saved

The pasted-bottom bag offered several outstanding advantages. It permitted better use of warehouse space. It increased the yield per warehouseman to *1,000,000 lbs. a month.* And it initiated the development of a similar design for the company's high density resins, which could increase the present pallet payload to 2,500 lbs.

Space-saving secret is in bottom of bag. New design (left) with rectangular-shaped base has 20 per cent more capacity than sewn-bottom bag (right).

Works for you five ways

Apart from bag construction and materials handling, Union-Camp's 5-Star Plan covers bag design, packaging machinery and specifications control. An improvement in any one of these areas conceivably could result in substantial savings for you. In any case, it costs nothing to find out. See your local Union-Camp man for complete details.

2,000 pallet load of new, low density resin bags fits easily through existing doors.

FREE 16-PAGE BOOKLET

Write Dept. M-3 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall operation.

UNION-CAMP*
MULTIWALL BAGS
Union Bag-Camp Paper Corporation 233 Broadway N.Y. 7 N.Y.

* NAME ON REQUEST

A $60,000,000 STEP IN ARMOUR'S PROGRAM OF PROGRESS

As America's need for more and better fertilizers grows, Armour Agricultural Chemical Company continues to improve its products and expand its facilities. The latest example of Armour's progressive philosophy is its new $60,000,000 program for increasing its nitrogen and phosphate production facilities. By 1962, new installations will approximately TRIPLE Armour's production of these materials. A nitrogen plant will be built near Sheffield, Alabama, and a phosphate plant near Fort Meade, Florida. In addition, facilities for manufacturing mixed fertilizers will be expanded and modernized.

New installations larger facilities and ever-improving technical methods have made Armour the most respected name in the fertilizer industry: a name synonymous with quality and dependability. The Armour Program of Progress is devoted to improving the products and services that have made the Armour "A" a symbol of quality in the fertilizer industry . . . the "BIG A" in agriculture.

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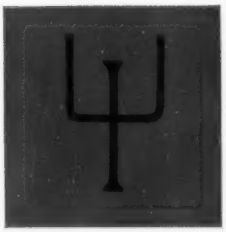
SALES OFFICES SERVING THE FERTILIZER INDUSTRY

ARMOUR AGRICULTURAL CHEMICAL COMPANY
General Offices, Atlanta, Georgia

SYMBOLS OF PLANT LIFE



*

During the centuries of medieval persecution and the attempted suppression of learning, every alchemist invented his own secret symbols even in experimenting with potash.

TODAY, THERE IS NO SECRET ABOUT THE ESSENTIAL ROLE POTASH PLAYS IN MIXED FERTILIZERS . . . HOW IT CONTRIBUTES TO THE PRODUCTION OF QUALITY CROPS.

SOUTHWEST POTASH CORPORATION PROVIDES MIXERS WITH A DEPENDABLE SUPPLY OF HIGH K$_{T.M.}$ MURIATE . . . STANDARD, COARSE AND GRANULAR . . . FOR THE PLANT FOOD INDUSTRY.

15th Century Alchemy process

SOUTHWEST POTASH CORPORATION

1270 Avenue of the Americas, New York 20, N.Y.

HIGH-K

*Another 15th Century Symbol for Potash

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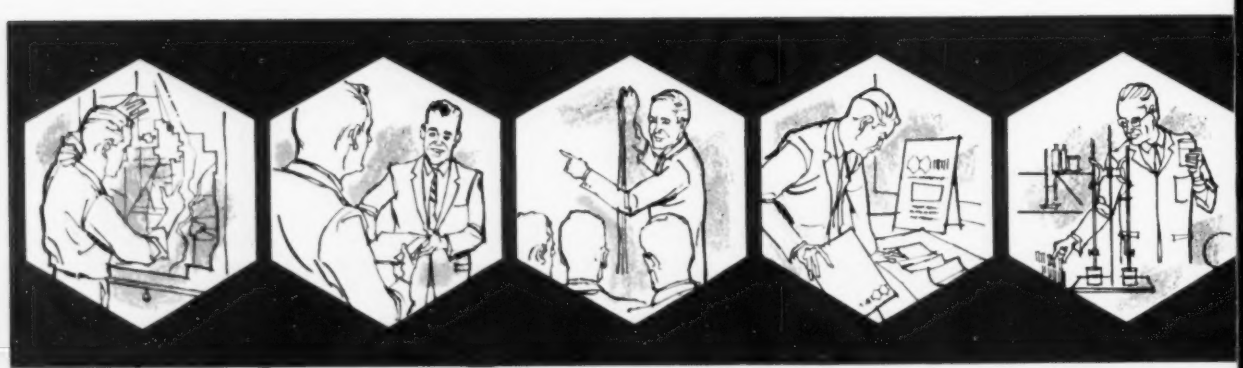
Why limit your total opportunity

Many of the fertilizer industry's most successful manufacturers rely on IMC as a single source for their full line of raw materials* and total service.

IMC interests itself in every phase of your marketing operation . . . does something positive about it. Total Service embraces marketing assistance, sales



MARKET ANALYSIS HELP | MANAGEMENT HELP | SALES, DEALER, FARMER MEETING ASSISTANCE | ADVERTISING PROMOTION HELP | TECHNICAL SERVICES

MOST COMPLETE LINE OF FERTILIZER MATERIALS

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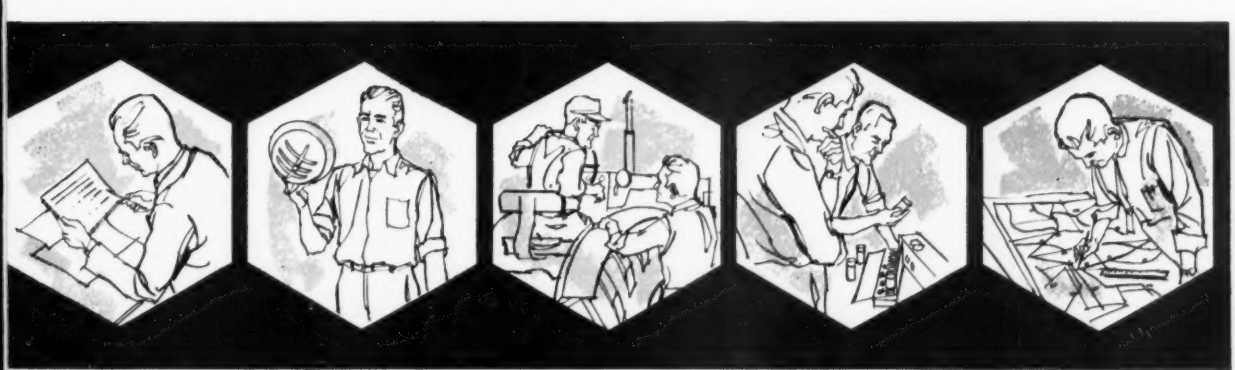
are yours with

SERVICE!

with anything less?

services, management help, technical service, year-round planning, transportation, insurance, safety, and credit and collection assistance.

Why limit your potential . . . take advantage of IMC's Total Service for your fullest profit opportunity. Join forces with IMC!



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PRODUCTS FOR GROWTH*

*TRADEMARK

FO-5-01

FIRST . . . IN MEASUREMENT AND CONTROL OF MATERIALS FLOW

Are you giving away plant food? Are you off grade because of inaccurate materials flow? Want to reduce material loss? Get dependable, accurate formulations with a rugged B-I-F continuous feeder. With stainless steel construction where it counts, this accurate, high capacity belt weigher-feeder puts more profit into both batch or continuous formulating.

Free Facts

Continuous feeding and blending save material, reduce costs, control quality . . . result in bigger processing profits. Write for free facts today!

B-I-F Industries

BUILDERS-PROVIDENCE • PROPORTIONEERS • OMEGA
538 HARRIS AVE., PROVIDENCE 1, RHODE ISLAND

—of This and That . . .

_____Two-way trade between Toledo and Europe in grain and fertilizer was predicted earlier this spring by Harold Anderson, senior partner of Andersons of Maumee. Mr. Anderson said there is terrific potential in the two-way movement of cargo and he planned to visit Europe this month to investigate westbound fertilizer shipments. The grain (and fertilizer) company head said that special ocean vessels will be constructed to carry grain from Great Lakes ports to Europe and bring back fertilizers or similar bulk commodities. Phosphate fertilizer, which now originates in Florida, could be brought to this area from Europe more cheaply, he added.

_____With spring come the lawn-spread confidence men. "Would the home-owner like some (rich-looking) fertilizer spread on his lawn for 4c a pound?" If so he may find it took a couple of tons of the stuff to cover the yard and be handed a bill for as much as $100; also find later that the "lawn-spread" was worthless.

_____Polk County's (Fla.) newest attraction for visitors this past winter at Bartow is the fossil-filled Phosphate Museum at Peace River Park on State Road 60, where phosphate was discovered by accident in 1888, and in famous nearby Bone Valley. The display building houses the finest collection of pleistocene fossils in the nation, considered far more complete than that in the Smithsonian Institute.

_____Somewhere we read that the St. Louis beer company Anheuser-Busch sought in a federal court petition to keep a Florida chemical company from using the slogan: "Where there's life, there's bugs."

_____International Paper's famed "Gator-Ride" display, entirely redesigned and recreated for 1961, again was a highlight of the American Management Associations National Packaging Exposition, Chicago, April 10-13. When a visitor boards the "Gator-Ride" he is seated in a specially-designed lounge chair and helped to don headphones. From these, he hears the story of the papermaking process as the chair is slowly propelled via chain drive through a 40 ft. tunnel lined with a series of transparencies showing the operation from woodlands to paper machines. Described as the largest single unit mechanizd display ever developed the "Gator-Ride" carries 55 ultra comfortable lounge chairs around a 206 foot track.

_____The Indianapolis Star (Indiana) has reported that a shipment of fertilizer with political overtones has been received by Floyd Bass Nursery. Called Vita Guano, it was spirited out of Cuba under the nose of Castro, possible because Fidel's men failed to smell out this odorless shipment. The report goes on to say that Cuban bats spent more time in caves than out, under the regime of deposed Fulgencio Batista. The Vita Guano packages contain the phrase "A Product of New Cuba." But Mr. Bass points this is not so. Says he, "Cuban bats have no political affiliation, and they've been at work thousands of years to produce Vita Guano."

_____Although the nation's horse population has dropped from 10 million to 3 million since 1940, horse collars are in demand again and are listed in Montgomery Ward's new 1961 farm catalog. "More horse collars are sold to city folks for basement recreation rooms than to farmers for horses," according to John V. Drum, Wards' farm equipment department merchandise manager. "The reason is a new fad for framing mirrors, pictures, and nostalgic mementos with horse collars."

Industry Meeting Calendar

DATE	EVENT	LOCATION	CITY
June 5-7	Southern Fertilizer Control Officials	Lafayette Hotel	Lexington, Ky.
June 11-14	National Plant Food Institute	The Greenbrier	Wh. Sul. Spgs., W. Va.
June 27-29	Pacific N.W. Fertilizer Conference	Marion Hotel	Salem, Oreg.
July 19-21	Southwest Fertilizer Conference	Galvez Hotel	Galveston, Tex.
Aug. 16-20	Canadian Fertilizer Association	Manoir Richelieu	Murray Bay, Que.
Oct. 4-6	Southeastern Fertilizer Conference	Biltmore Hotel	Atlanta, Ga.
Oct. 12-13	Northeastern Fertilizer Conference	Schine Inn	Chicopee, Mass.
Oct. 25-26	Fertilizer Control Officials	Woodner Hotel	Washington, D. C.
Oct. 30-Nov. 1	National Fertilizer Solutions Assn.	Edgewater Beach Hotel	Chicago, Ill.
Oct. 30-Nov. 1	Official Agricultural Chemists	Shoreham Hotel	Washington, D. C.
Nov. 2-3	Pacific N.W. Fertilizer Assn.	Gearhart Hotel	Gearhart, Oreg.
Nov. 8-10	Fertilizer Industry 'Round Table'	Mayflower Hotel	Washington, D. C.
Nov. 12-14	California Fertilizer Association	Jack Tar Hotel	San Francisco

Arcadian® News

Volume 6 | Nitrogen Division, Allied Chemical Corporation | Number 5

THE ADVANTAGES OF 20% SUPERPHOSPHATE IN MIXED FERTILIZERS

20% superphosphate is the key to the great progress which has been made in the manufacture of mixed fertilizers in this country. Manufacturers began to supply farmers with better fertilizers when industry research developed:

1. The production of 20% superphosphate by the acidulation of phosphate rock.
2. The production of nitrogen solutions for the ammoniation of 20% superphosphate to provide an economical base for mixed fertilizers.

20% superphosphate is the heart of a successful fertilizer technology which has supplied American farmers with millions of tons of efficient crop-producing power at low cost.

New gimmicks have come along for making fertilizers. New and more concentrated phosphorus carriers have been developed. But, no new method has been devised that will produce better quality fertilizers at lower cost than the technology which centers on the ammoniation of 20% superphosphate.

In the first place, 20% superphosphate has many basic advantages over other more concentrated phosphorus carriers. It is a lower cost source of phosphorus and it contains large quantities of gypsum (discussed elsewhere in this issue of ARCADIAN News).

20% superphosphate supplies phosphorus that remains in the soil available to plants over a longer period than phosphorus from more concentrated carriers which have a tendency to become fixed in the soil in compounds that cannot be used by plants.

Ammoniation of superphosphate has become the mainstay of the fertilizer industry since the creation of nitrogen solutions by Allied Chemical Corporation in 1929.

20% superphosphate will absorb more low-cost nitrogen through ammoniation with low-cost nitrogen solutions than will more concentrated phosphorus carriers. Low-cost 20% superphosphate and low-cost nitrogen solutions have enabled fertilizer manufacturers to supply farmers with low-cost, high-quality fertilizers.

Industry research with ammoniated superphosphate has helped in the improvement of the condition of all types of fertilizers and helped in the development of granular fertilizers.

As long as fertilizer manufacturers continue to make the largest possible utilization of 20% superphosphate and high levels of ammoniation, the situation favorable to the increased use of mixed fertilizers will exist and flourish.

Arcadian News for Fertilizer Manufacturers from Nitrogen Division, Allied Chemical

THE LOW COST WAY TO PUT N IN N-P-K

The most economical way to put nitrogen into mixed fertilizers is through the ammoniation of 20% superphosphate with nitrogen solutions. This tried and proven technique has been used with outstanding success by many manufacturers for many years.

Through the years, the technology of ammoniation has been constantly improved by the development of modern methods and the introduction of new types of ARCADIAN® Nitrogen Solutions. The result is more efficient production of better fertilizers.

Higher and higher levels of nitrogen take-up by superphosphate have been achieved. The standard rate at one time was 3 pounds of ammonia per unit of P_2O_5. Today it is common practice for one unit of P_2O_5 in 20% superphosphate to accommodate 5½ to 6½ pounds of free ammonia, without the aid of acid or the loss of nitrogen. A big tonnage of good fertilizer is being made with ARCADIAN Nitrogen Solutions supplying 1 unit of nitrogen for each 2 units of P_2O_5.

Through the use of acid, much higher rates are obtained. Some fertilizer manufacturers use this practice to produce 10-10-10 fertilizer with all the nitrogen from solutions.

High take-up of free ammonia by superphosphate is usually desirable in the manufacture of any mixed fertilizers. It is particularly desirable in the production of granular fertilizers. A high rate of ammoniation not only adds large quantities of low-cost nitrogen, it also generates heat at an opportune time in granulation.

Ask Allied Chemical

Efficient ammoniation involves proper technique, equipment and materials. There is a complete line of ARCADIAN Nitrogen Solutions from which you can make selections adapted to your particular conditions.

Nitrogen Division technical men are experts in ammoniation. Their advice is free to customers. Contact: Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

Ammoniated Superphosphate Contains Four Plant Foods

You ammoniate 20% superphosphate to put nitrogen and phosphorus in your fertilizer. But, don't forget, you also include large quantities of sulphur and calcium. In fact, 20% superphosphate contains more sulphur and more calcium than phosphorus.

Other more concentrated sources of phosphorus, such as triple superphosphate and ammonium phosphate, are deficient in calcium and sulphur because the gypsum has been removed.

It will pay you to tell farmers about the two bonus plant foods they get in your mixed fertilizers made with 20% superphosphate. For every unit of phosphorus in 20% superphosphate, you give the farmer 137 pounds of gypsum (calcium sulphate).

Both the calcium and the sulphur in gypsum are valuable plant foods. In addition, gypsum is an excellent soil conditioner, widely used to improve water penetration in tight soils. Farmers use hundreds of thousands of tons of gypsum each year in addition to the gypsum they get in superphosphate.

You charge your customers for the nitrogen, phosphoric acid and potash in your mixed fertilizer. When you use ammoniated superphosphate, you also give them calcium, sulphur and a soil conditioner at no extra cost except for transportation.

The value of calcium in fertilizer is well known. Calcium is an essential plant food. It also helps to counteract the effect of low pH. Many crops grow well at a low pH when they have an adequate supply of calcium from gypsum.

The value of sulphur in fertilizer is demonstrated by the fact that crops, on the average, remove about as much sulphur from the soil as they do phosphorus. Yet the average soil contains only half as much sulphur as phosphorus.

With the increase in the use of sulphur-deficient triple superphosphate and ammonium phosphate in concentrated fertilizers, much land gets little sulphur. The lack of this secondary plant food element is more and more apt to limit crop yields and profits.

Critical Sulphur Shortage

The shortage of sulphur is becoming critical for many crops on many soils. Cotton, corn, tobacco, legumes, grass, onions and cabbage are heavy users of sulphur. Field tests in many areas now show definite response of crops to additional sulphur.

Symptoms of sulphur deficiency appear in corn and other crops as pale green leaves, not to be confused with the drying up of older, lower leaves, typical in nitrogen deficiency. Sulphur is needed to produce the essential amino acids that go into making the protein of plant cells.

Sulphur is required for good nodule formation on legume roots. With cotton, lack of sulphur reduces number of bolls matured, rate of growth and yield of seed cotton. On an elemental basis, the

Cotton is a heavy user of sulphur. So are corn, legumes, onions and cabbage. Many soils are running out of sulphur fast!

corn plant actually uses as much sulphur as it does phosphorus. A 100-bushel crop requires 160 pounds of nitrogen, 25 pounds of elemental phosphorus, 100 pounds of potassium, and 25 pounds of sulphur.

Sulphur leaches out of the soil almost as fast as potash or calcium, and it needs to be applied frequently. In the past, sulphur requirements of plants have been largely ignored because most fertilizers have carried substantial amounts of sulphur along with nitrogen, phosphorus and potash.

All of the available evidence builds up an impressive case for continuing to supply sulphur in mixed fertilizers. When you ammoniate superphosphate for your mixed fertilizers, you are giving farmers a bargain in free sulphur, calcium and soil conditioner. You and your dealers will benefit by telling farmers about these bonus values.

PLEASE DO NOT HOLD TANK CARS TOO LONG

Nitrogen Division, Allied Chemical Corporation, is doing its utmost to keep its delivery facilities operating at top efficiency during this period of peak demand for nitrogen. Extra effort is being exerted to keep tank cars rolling to your plant to supply you with ARCADIAN® Nitrogen Solutions when you want them.

The only thing that can interfere with this service is a shortage of tank cars. Despite the fact that Nitrogen Division is operating more tank cars than ever before, if too many fertilizer manufacturers hold too many tank cars too long, a shortage may cause slow deliveries.

You can cooperate by returning empty tank cars as quickly as possible. A tank car sitting idle on your siding—or anyone else's—can't also be back at the nitrogen plant taking on that rush order you just placed. So unload tank cars as fast as you can and return them.

You cannot mix and ship tonnage on schedule if you are waiting for nitrogen solutions. And Nitrogen Division, Allied Chemical Corporation, cannot ship solutions on schedule if tank cars are not available. Don't hold tank cars! Keep 'em rolling to serve you!

Complete Fertilizer Service Builds Exclusive Customers

Everyone who sells fertilizers wants plenty of exclusive customers. The best way to build customer loyalty is to be prepared to supply all of the mixed goods analyses and straight materials the farmer needs and wants. You are in danger of losing a customer when you provide only part of his plant food needs and force him to go elsewhere to buy what you do not sell.

You can't help but benefit when your customers make you their headquarters for all their fertilizer requirements. It pays to establish your prestige and your leadership as a dependable, one-stop, full-line source of supply.

You will find it profitable to study market trends so that you can anticipate demands and be prepared to supply these demands. Three important trends are now evident in fertilizer consumption figures: **1.** The growth in the use of high-nitrogen fertilizers. **2.** The fact that more nitrogen is sold as straight materials than in mixed fertilizers. **3.** The rapid increase in the use of nitrogen solutions for direct application.

Experiment Stations are recommending more and more nitrogen for crops. Corn and several other major crops require more nitrogen than any other plant food. More and more farmers are testing their soils and they know their needs.

For many crops and soils, farmers have found that it pays to use more than one application of nitrogen. They apply part of their nitrogen in mixed fertilizers and part of it in one or more separate applications of straight material.

Sell straight nitrogen materials along with your mixed fertilizers and you increase your sales and your profits. There was a time when straight nitrogen materials did not offer an attractive profit margin to fertilizer manufacturers. But the situation is different today, particularly in the case of ARCADIAN® Nitrogen Solutions for direct application.

Some fertilizer manufacturers are finding that they make bigger profits from ARCADIAN Golden URAN®, ARCADIAN FERAN® and ARCADIAN NITRANA® than they make from mixed fertilizers.

When you sell ARCADIAN nitrogen materials (liquid and dry) for direct application, you help farmers to get better yields and insure that response to your mixed fertilizers will not be limited by lack of nitrogen. You sell a bigger tonnage of plant food and you build farmers into exclusive customers for you and your dealers.

You will find it profitable to let Nitrogen Division, Allied Chemical, work with you in helping you to offer your customers a complete line of mixed fertilizers and straight nitrogen materials.

Many different ARCADIAN Nitrogen Solutions are available for the manufacture of every mixed fertilizer analysis now in demand. Many different ARCADIAN Nitrogen Products (liquid and dry) are also available to sell to farmers for direct application.

Start now to make ARCADIAN Nitrogen a sales builder for you. Contact: Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y. Phone: HAnover 2-7300.

Arcadian® NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
DURANA®									
DURANA contains 8% formaldehyde.	37.0	13.3	53.4	15.9	9.4	7.2	1.235	0	36
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	-108

Other ARCADIAN® Products: URAN® and FERAN® Solutions • Ammonia Liquor • N-dure® A-N-L® • Ammonium Nitrate • UREA 45 • Nitrate of Soda • Sulphate of Ammonia

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

NITROGEN DIVISION

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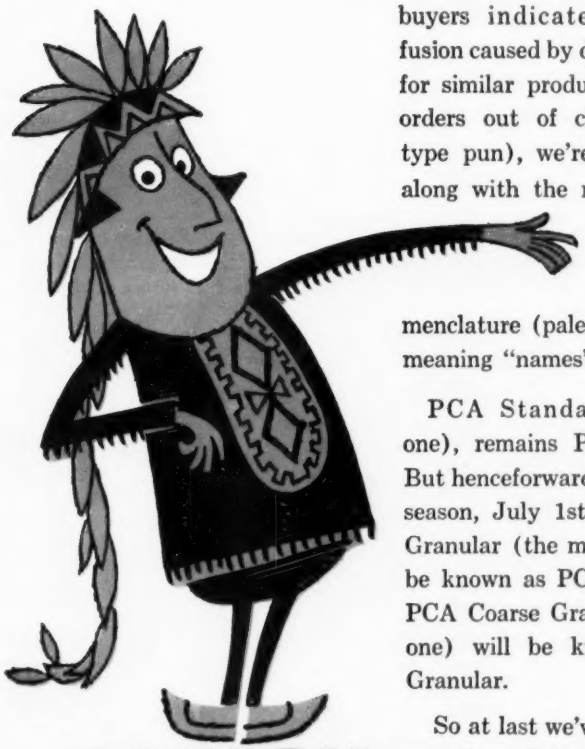
We're name dropping but...

Big Chief Kay-Two-Oh is only trying to impress you with the fact that all sizes of our 60% Muriate of Potash, by ANY name, are the best bet for your manufacturing operations.

At a recent pow-wow, a special committee of the National Plant Food Institute suggested that distress smoke signals from buyers indicate (ugh!) confusion caused by different names for similar products. To bring orders out of chaos (Indian-type pun), we're happy to go along with the rest of the industry in standardizing our nomenclature (paleface-type word meaning "names").

PCA Standard (the little one), remains PCA Standard. But henceforward, as of the new season, July 1st, PCA Special Granular (the middle one) will be known as PCA Coarse, and PCA Coarse Granular (the big one) will be known as PCA Granular.

So at last we've answered the question: What's in a name? Convenience for you in ordering from any source. But for top quality potash, and top service, be sure to order from PCA, top man on the totem pole.



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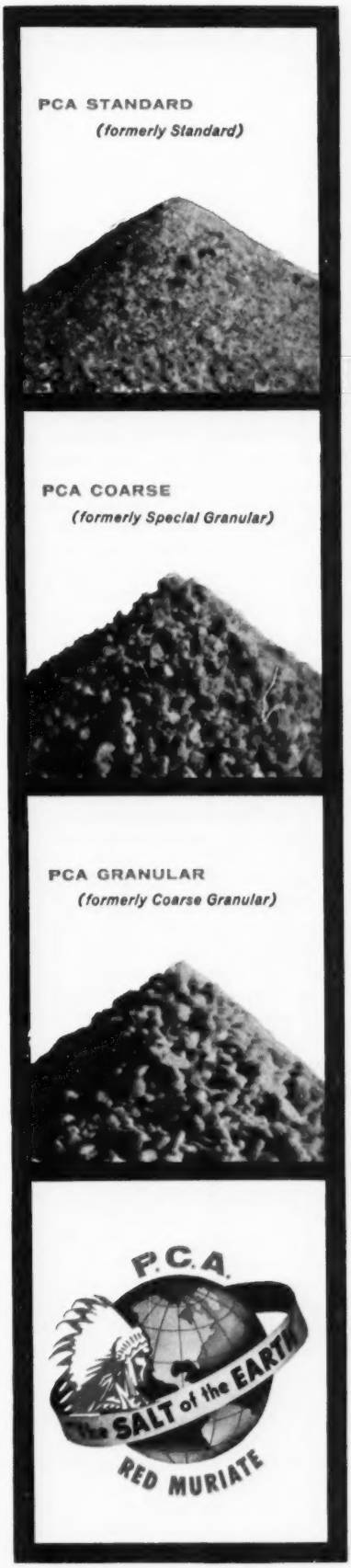


TONNAGE DOWN FRACTIONALLY NUTRIENT CONTENT UP

Preliminary Report on Consumption of Commercial Fertilizers and Primary Plant Nutrients in the United States Year Ended June 30, 1960

By Walter Scholl, Marion M. Davis, *and* Caroline A. Wilker
Fertilizer Investigations Research Branch
Soil and Water Conservation Research Division
Agricultural Research Service
U. S. Department of Agriculture
Beltsville, Maryland

Fertilizer Products marketed for farm and non-farm use in the United States during the year ended June 30, 1960, were generally lower in tonnage than in the preceding year. Total consumption based on shipments by manufacturers, sales by liquid nitrogen applicators, and on State tonnage reports was 25,022,000 tons. This was 290,000 tons (1.1 percent) less than the 25,312,672 tons recorded for the year ended June 30, 1959. There were increases in 18 States and the District of Columbia (table 1). In these, 713,000 tons more fertilizer were consumed totaling 9,605,000 tons or about 38 percent of overall consumption. California, Florida, and Georgia accounted for 526,000 tons of the increase. Consumption decreased in 31 States and Puerto Rico by 1,003,000 tons, approximately one-half of which was in Illinois, Missouri, North and South Carolina. These changes in consumption from the preceding year were scattered through most of the regions. Increases were noted for all States in the West South Central region while decreases were recorded in all States in the Middle Atlantic and East North Central regions.

Mixed Fertilizers comprised 63.5 percent of the total tonnage of all fertilizer products consumed and amounted to 15,880,000 tons —a decrease of 189,000 tons (1.2 percent) from consumption (16,069,027 tons) for the year ended June 30, 1959. In 21 States and the District of Columbia increases were recorded totaling 429,000 tons of which 336,000 tons were in Florida and Georgia. There were decreases in 28 States and Puerto Rico totaling 618,000 tons. Twenty States to the east of the Mississippi River recorded decreases and only eight to the west.

There were 50 grades recorded in amounts of 50,000 tons or more, totaling 12,233,000 tons (table 2). These accounted for 77 percent of the total tonnage of mixtures and about 1,700 other grades made up the remaining 23 percent of the tonnage consumed. The relative use of most of these 50 grades corresponded

Table 1.—Fertilizers consumed as mixtures and as materials, year ended June 30, 1960, compared with consumption the previous year, by State and region[1] (Preliminary)

State and region	Mixtures	Materials[2]	Consumption	Total Change from year ended June 30, 1959
	1,000 tons	1,000 tons	1,000 tons	1,000 tons
Maine	151	11	162	-18
New Hampshire	14	4	18	-3
Vermont	38	18	56	[3]
Massachusetts	68	15	83	-7
Rhode Island	15	2	17	4
Connecticut	56	16	72	-7
New England	342	66	408	-34
New York	518	75	593	-30
New Jersey	214	24	238	-17
Pennsylvania	575	81	656	-10
Delaware	87	6	93	-3
District of Columbia	4	2	6	1
Maryland	281	20	301	-11
West Virginia	64	11	75	-1
Middle Atlantic	1,743	219	1,962	-72
Virginia	647	99	746	-50
North Carolina	1,283	320	1,603	-151
South Carolina	578	206	784	-111
Georgia	1,418	312	1,730	253
Florida	1,380	179	1,559	94
South Atlantic	5,306	1,116	6,422	34
Ohio	940	119	1,059	-40
Indiana	882	271	1,153	-25
Illinois	613	869	1,482	-115
Michigan	584	81	665	-71
Wisconsin	372	49	421	-57
East North Central	3,391	1,389	4,780	-308
Minnesota	383	148	531	-17
Iowa	441	250	691	-5
Missouri	505	297	802	-131
North Dakota	49	94	143	11
South Dakota	11	24	35	-4
Nebraska	47	274	321	16
Kansas	114	220	334	44
West North Central	1,550	1,307	2,857	-86
Kentucky	461	110	571	-25
Tennessee	488	133	621	20
Alabama	804	270	1,074	-6
Mississippi	322	369	691	-11
East South Central	2,075	882	2,957	-21
Arkansas	172	190	362	3
Louisiana	162	144	306	15
Oklahoma	78	67	145	11
Texas	298	411	709	44
West South Central	710	812	1,522	73
Montana	4	40	44	3
Idaho	17	126	143	8
Wyoming	1	17	18	2
Colorado	17	74	91	2
New Mexico	2	42	44	3
Arizona	32	147	179	-17
Utah	6	24	30	-7
Nevada	2	4	6	4
Mountain	81	474	555	-6
Washington	41	173	214	-29
Oregon	34	170	204	4
California	337	2,432[5]	2,769	179
Pacific	412	2,775	3,187	154
Total	15,610	9,040	24,650	-266
Hawaii	58	69	127	-11
Puerto Rico	212	33	245	-13
UNITED STATES: 1959-60	15,880	9,142[6]	25,022	-291
1958-59	16,069	9,244[6]	25,313	0
1957-58	14,353	8,163[6]	22,516	2,506

[1] Due to rounding, column or cross totals may not balance. [2] Includes ground phosphate rock and colloidal phosphate, basic slag, and secondary and trace nutrient materials (borax, metallic salts, sulfur, gypsum, etc.) consumed as separate materials. Does not include liming materials or the quantities of materials used in manufacture of commercial mixtures. [3] Increases in amounts less than 500 tons. [4] Decreases in amounts less than 500 tons. [5] Includes an estimated 270,000 tons or dried manures. [6] Includes materials not guaranteed to contain N, P_2O_5, or K_2O, amounting to 1,375,000 tons in 1959-60, 1,223,204 tons in 1958-59, and 939,728 tons in 1957-58.

to that of the preceding year although at a somewhat lower level. Five of the grades — 5-10-10, 4-12-12, 5-20-20, 12-12-12, and 10-10-10— were those recorded in largest amounts and their combined tonnages accounted for about one-third of the total tonnage of mixtures consumed in each year. One or more of these five grades are among the grades consumed in largest tonnages in most of the States.

MATERIALS marketed for direct application amounted to 9,142,000 tons and comprised 36.5 percent of all fertilizer products used in the year ended June 30, 1960. Included in this tonnage are 7,767,00 tons of materials containing one or more of the primary plant nutrients (N, P_2O_5, K_2O) and 1,375,000 tons of materials containing only secondary and trace nutrients principally calcium and sulfur largely in the form of gypsum. The consumption of materials containing primary nutrients decreased 253,000 tons (3.2 percent) whereas consumption of secondary and trace nutrient materials increased 152,000 tons (12.4 percent).

The principal kinds of materials and the tonnages marketed in each region are shown in table 3. Chemical nitrogen products comprised the only class of primary nutrient materials which increased in overall use. Although most of the products listed in this class were used in lower quantities than in the preceding year, the higher use of anhydrous ammonia, urea, and in particular, the nitrogen solutions offset the decreases in quantities of the other products used. Consumption of the natural organics was generally lower in most areas. The use of phosphate materials as a class decreased but registered gains in the New England, West South Carolina, and Pacific regions. Of the listed products, consumption increased only in the ammoniated phosphates and decreased principally in basic slag and phosphate rock. Potash materials consumed as a class decreased but recorded a small increase in the South Central region. The increased use of the secondary and trace nutrient materials was due principally to the increase in the tonnage of gypsum used in the Pacific region.

PRIMARY PLANT NUTRIENTS supplied by all fertilizer products consumed during the year ended June 30, 1960, totaled 7,571,000 tons (table 4). This amount based on the guaranteed nutrient content of these products with allowances for overruns and underruns determined from analyses of samples reported by State fertilizer control officials, was higher than that found for the larger tonnage of products used in the preceding year. This represented an increase in primary plant nutrients of 155,000 tons (2.1 percent) from that (7,415,713 tons) consumed in 1958-59. In 1959-60, consumption of nitrogen was 2,767,000 tons, an increase of 94,000 tons (3.6 percent); that of available P_2O_5, 2,566,000 tons —15,000 tons (0.6 percent) more; and that of K_2O, 2,238,000 tons—46,000 tons (2.1 percent) above their amounts in the preceding year. These quantities establish a record high in the Nation's history easing last year's consumption into second place.

Mixtures supplied 1,052,000 tons (38.0

Table 2.—Principal grades of mixtures consumed in United States, year ended June 30, 1960[1] (Preliminary)

Grade	Consumption	Grade	Consumption	Grade	Consumption	Grade	Consumption
	1,000 tons		1,000 tons		1,000 tons		1,000 tons
0-10-20	80	4- 8-12	212	6- 6- 6	101	8-24- 8	55
0-14-14	158	4- 9- 3	54	6- 8- 6	102	10- 6- 4	82
0-20-20	254	4-10- 6	73	6- 8- 8	243	10-10-10	702
2-12-12	248	4-10- 7	244	6-10- 4	53	10-20-10	228
3- 9- 9	464	4-12- 8	103	6-12- 6	85	10-20-20	62
3- 9-12	57	4-12-12	1,158	6-12-12	494	12-12-12	886
3- 9-18	83	4-16-16	371	6-24-12	269	13-13-13	69
3- 9-27	53	5-10- 5	300	6-24-24	247	14- 0-14	51
3-12- 6	54	5-10-10	1,567	7-28-14	75	14- 4-10	69
3-12-12	464	5-10-15	398	8- 4- 8	58	14-14-14	55
4- 7- 5	88	5-20-10	77	8- 8- 8	218	16-48- 0	53
4- 8- 6	50	5-20-20	949	8-12-12	68	Other[2]	3,647
4- 8- 8	91	6- 4- 8	74	8-16-16	184	Total	15,880

[1] Grades consumed in amounts of 50,000 tons or more.
[2] Approximately 1,700 grades.

Table 3.—Kinds of fertilizers consumed, year ended June 30, 1960, by region, in 1,000 tons[1] (Preliminary)

Kind	New England	Middle Atlantic	South Atlantic	North East Central	West North Central	East South Central	West South Central	Mountain	Pacific	Hawaii, Puerto Rico	Total Consumption	Total Change from year ended June 30, 1959
MIXTURES	342	1,743	5,306	3,391	1,550	2,075	710	81	412	270	15,880	-189
CHEMICAL NITROGEN MATERIALS	15	88	819	513	725	609	515	237	929	75	4,525	31
Ammonia, anhydrous	0	3	26	79	179	72	166	46	145	1	717	35
Ammonia, aqua	0	[2]	0	7	15	3	7	23	311	42	398	-74
Ammonium nitrate[3]	7	31	157	158	312	284	127	77	77	1	1,231	-43
Ammonium nitrate-limestone mixtures	[2]	1	221	[3]	0	37	4	1	[2]	0	264	-42
Ammonium sulfate	[2]	12	5	106	9	14	80	45	239	25	535	-14
Nitrogen solutions	3	6	161	122	200	29	37	10	79	0	657	142
Sodium nitrate	2	12	224	2	[2]	159	54	[2]	[2]	[2]	453	-25
Urea	1	9	5	27	7	4	31	20	37	6	147	37
Other[4]	2	13	20	12	3	7	9	15	41	[2]	122	16
NATURAL ORGANIC MATERIALS	17	34	31	35	10	3	7	7	329	[2]	473	-45
Dried manures	5	11	5	7	4	2	2	1	272	0	309	-13
Sewage sludge, all	7	16	11	27	6	1	2	4	47	[2]	121	-10
Tankage, all	2	5	3	1	0	[2]	0	[2]	1	[2]	13	-6
Other[4]	3	2	12	[2]	[2]	[2]	3	1	9	0	30	-16
PHOSPHATE MATERIALS	32	82	89	633	522	196	247	197	280	14	2,292	-222
Ammoniated phosphates[5]	[2]	2	1	20	187	5	121	88	131	3	558	19
Basic slag	0	0	13	0	0	58	3	0	0	0	74	-66
Calcium metaphosphate	[2]	[2]	1	5	12	16	[2]	[2]	[2]	0	35	-9
Phosphate rock & colloidal phosphate	[2]	8	26	471	127	16	23	[2]	[2]	3	675	-163
Superphosphate: 22% and under	30	65	43	46	46	89	51	16	110	1	498	-10
" : over 22%	[2]	3	2	88	149	11	44	79	20	7	403	-2
Other[4]	1	3	3	3	1	1	5	13	18	[2]	48	8
POTASH MATERIALS	2	9	76	204	49	68	40	3	15	10	477	-18
Potassium chloride	1	6	33	199	49	51	38	2	8	9	396	-10
Other[6]	1	3	43	5	1	17	2	1	7	1	81	-8
Total: Primary Nutrient Fertilizers	408	1,956	6,321	4,776	2,856	2,951	1,519	526	1,965	369	23,647	-442
SECONDARY & TRACE NUTRIENT MATERIALS	[2]	6	101	4	1	6	3	30	1,221	3	1,375	152
Gypsum	[2]	5	97	1	1	5	1	22	1,162	0	1,294	134
Other[4]	[2]	1	4	2	[2]	1	2	8	59	3	81	18
TOTAL: ALL FERTILIZERS	408	1,962	6,422	4,780	2,857	2,957	1,522	555	3,187	372	25,022	-290

[1] States comprising the regions are listed in table 1. Due to rounding, totals of items may not add to column or class totals. [2] Less than 500 tons. [3] Undetermined quantities may have been used for non-fertilizer purposes. [4] Includes quantities undesignated by kind. [5] Includes all reported quantities of grades: 11-48-0, 13-39-0, 16-20-0, 20-52-0, 21-53-0, and 27-14-0.

Table 4.—Primary plant nutrient contents of mixtures and materials consumed in regions and United States, year ended June 30, 1960, by kinds, [1] [2] in 1,000 tons (Preliminary)

Kind	New England	Middle Atlantic	South Atlantic	East Central	West Central	East South Central	West South Central	Mountain	Pacific	Hawaii and Puerto Rico	United States Consumption	United States Change from yr. ended 6-30-59
Nitrogen												
MIXTURES	28	106	300	221	142	102	61	12	47	34	1,052	52
MATERIALS	5	29	208	201	361	206	253	108	325	18	1,715	42
Ammonia, anhydrous	0	2	21	65	147	59	136	38	119	—	587	28
" , aqua	0	—	0	2	3	1	1	5	62	9	83	-14
Ammonium nitrate	2	11	53	53	105	96	43	26	26	—	415	-14
Ammonium nitrate-limestone mixtures	—	—	46	—	0	8	1	—	—	0	56	-8
Ammonium sulfate	—	2	1	22	2	3	17	9	50	5	111	-4
Calcium cyanamide	—	1	2	—	0	1	2	1	1	—	8	-1
Natural organics	1	2	2	2	1	—	—	—	6	—	14	0
Nitrogen solutions	1	2	41	39	71	9	11	3	18	0	195	36
Phosphate products	—	—	—	3	28	1	19	14	21	1	87	4
Potassium products	—	—	2	—	0	—	0	0	0	0	2	-1
Sodium nitrate	—	2	36	—	—	26	9	—	—	—	73	-4
Urea	1	4	2	12	3	2	14	9	17	3	67	17
Other Chemical nitrogen products	—	2	2	3	1	—	—	2	6	—	16	4
Total nitrogen	33	135	508	422	503	308	314	120	372	52	2,767	94
Available P_2O_5												
MIXTURES	40	208	490	561	302	235	119	16	56	16	2,043	29
MATERIALS	7	19	14	79	149	41	62	71	78	3	523	-14
Ammoniated phosphates	—	1	—	10	58	2	30	25	33	1	160	3
Basic slag	0	0	1	0	0	5	—	—	—	0	23	-5
Calcium metaphosphate	—	—	1	3	8	10	—	0	0	0	6	-6
Natural organics	1	1	1	1	—	—	—	—	6	—	11	-1
Phosphate rock and colloidal phosphate[3]	—	—	1	14	4	—	1	—	—	—	21	-4
Superphosphate: 22% and under	6	14	8	9	10	18	10	3	22	—	100	-2
" : Over 22%	—	1	1	41	69	5	20	35	9	2	183	-2
Other phosphate products	—	1	1	1	—	—	—	7	8	—	19	3
Total available P_2O_5	47	227	504	640	451	276	181	87	134	19	2,566	15
K_2O												
MIXTURES	43	198	626	526	193	234	79	3	30	35	1,967	53
MATERIALS	1	5	28	123	30	36	23	2	17	6	271	-7
Natural organics	—	—	—	—	—	—	—	—	8	—	8	-2
Potassium chloride	1	4	20	121	30	31	23	1	5	5	241	-6
Other potassium products	—	1	8	2	—	5	—	1	4	1	22	1
Total K_2O	44	203	654	649	223	270	102	5	47	41	2,238	46
GRAND TOTAL: N, avail. P_2O_5, K_2O												
1959-60	124	565	1,666	1,711	1,177	854	597	212	553	112	7,571	155
1958-59	130	575	1,562	1,765	1,146	818	552	209	542	117	7,416	0
1957-58	129	539	1,366	1,569	886	726	497	196	501	103	6,512	-904

[1] States comprising the regions are listed in table 1. Due to rounding, totals of items may not add to column or class totals.
[2] Dashes (—) represent quantities less than 500 tons.
[3] Represents a weighted average of 2 percent for the collodial phosphate and 3 percent for the phosphate rock.

percent) of the nitrogen, 2,043,000 tons (79.6 percent) of the available P_2O_5, and 1,967,000 tons (87.9 percent) of the K_2O. Although the tonnage of mixed fertilizer products was slightly lower than in the preceding year, the content of primary nutrients was higher by 134,000 tons and accounted for over one-half of the increase in nitrogen and all of the increase in available P_2O_5 and K_2O. These higher nutrient contents from lower tonnage of mixtures reflect the continued upward trend in use of higher grade mixtures. The weighted average nutrient contents of mixtures consumed in 1959-60 were for nitrogen, 6.6 percent; for available P_2O_5, 12.9 percent; for K_2O, 12.4 percent; and for the total of these nutrients, 31.9 percent. The corresponding averages for the preceding year were 6.22, 12.54, 11.91, and 30.67 percent, respectively.

Primary nutrients supplied by direct-application materials comprised 1,715,000 tons (62.0 percent) of the nitrogen, 523,00 tons (20.4 percent) of the available P_2O_5, and 271,000 tons (12.1 percent) of the K_2O. Of these nutrients, only nitrogen was supplied in increased amounts, principally through increased use of anhydrous ammonia, nitrogen solutions, urea, and the ammoniated phosphates. Decreases in the consumption of P_2O_5 and K_2O in direct-application materials largely were associated with decreases in the direct use of basic slag, calcium metaphosphate, phosphate rock, and potassium chloride.

Ortho Contest Draws Big Response From Gardeners

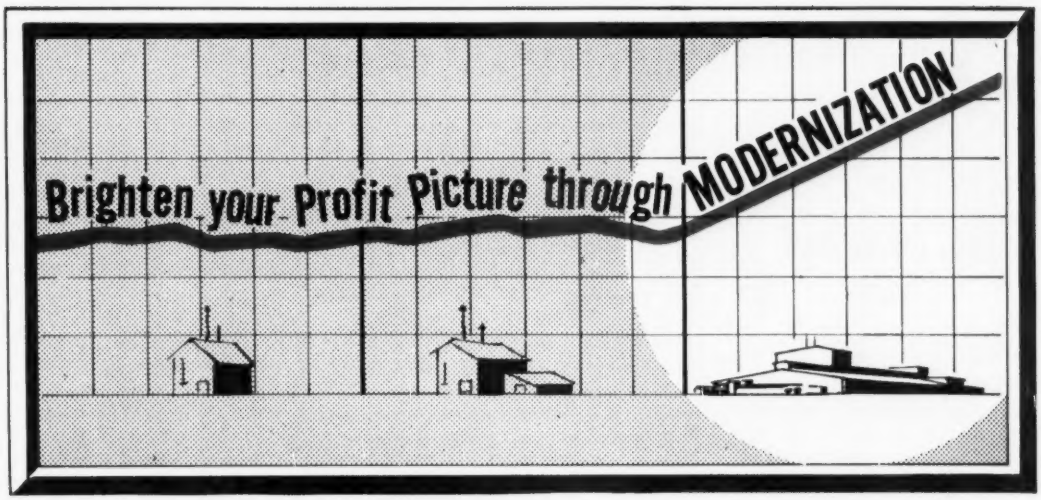
Hundreds of home gardeners from all sections of the country, Hawaii and Canada, expressed themselves on the topic "What My Garden Should Do for Me," in a contest sponsored by the Ortho Division of California Chemical Company.

According to Louis F. Czufin, Ortho advertising manager, "the judges were surprised—and garden supply dealers should be delighted—by the variety of reasons given for finding satisfaction in gardening. It looks like home gardens are here to stay . . . they have something for everyone.

New Bulk Fertilizer Handling

A new method of bulk fertilizer handling was recently used for the first time in an actual field operation at the Ortho Fertilizer Plant in Richmond, Calif. A big semi-truck and trailer rig had been loaded with 20 tons of Ortho 20-10-0 pelleted fertilizer. The trailers are like tanks for hauling bulk liquids, but have an engine and compressor mounted forward of the front trailer. From the compressor ran heavy hose and pipe linkages, which went into the big tanks. At the bottom of each unit were hoppers, each of which included, in addition to the usual door, a massive hose fitting and valve.

At the airport air pressure in the 450 cubic foot tank forced pelleted fertilizer out through the hose and into the aircraft at the rate of 1500 pounds per minute. This new method of handling bulk fertilizer eliminates intermediate handling and speeds up delivery time considerably.



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This is the eighth in a series of articles covering various aspects of the fertilizer dealer-farmer survey made by the authors.

the Role of the Dealer

CHARACTERISTICS OF LARGE VOLUME

Fertilizer Dealers

by George M. Beal *and* Joe M. Bohlen

The fertilizer industry is justifiably proud of the product it sells. Its economic value to farmer customers has been proven. Many research studies show that fertilizer is one of the highest—if not the highest—marginal return inputs in which farmers can invest. One of the persistant problems facing the fertilizer industry is how best to merchandise the product through a marketing structure from the manufacturer to the farmer customer. Although there is a wide variety of marketing structures used by the various manufacturers, the local dealer is still one of the major links in the marketing structure. Some local dealers are doing a good merchandising job. Others leave much to be desired.

In a study of a random sample of 118 Iowa fertilizer dealers it was found that fertilizer was the major product line of only nine percent of the dealers. Forty-one percent of the dealers defined their fertilizer department as "just another customer service," or "not a money maker." Thirty-one percent of the dealers said the fertilizer business was "poor," another 23 percent said it was "just average." Only 28 percent thought the profit margins in fertilizer were average. Half of the dealers **did not** see their role as consultants on fertilizer matters with their farmer customers. Less than half of the dealers thought they should make recommendations to their customers on fertilizer use. On the average, fertilizer dealers gave correct answers to less than half of the items in a fertilizer knowledge scale.

A study completed in a southeastern state showed, in general, findings which were even more negative.

On the other hand, there are many dealers who had favorable attitudes toward the fertilizer business. Twenty-two percent of the dealers said the fertilizer business was "excellent." Twenty-seven percent said their fertilizer business was a "good money maker in itself." The profit margin was regarded as adequate by 28 percent of the dealers. Forty-five percent of the dealers did see themselves as consultants on fertilizer matters and approximately the same number were willing to make fertilizer recommendations to their customers. Over one-fourth of the dealers had high knowledge scores relating to fertilizer. Over one-third of the dealers were highly oriented toward the adoption of new merchandising techniques. Dealers with these more positive attitudes were moving relatively large volumes of fertilizer. In fact 26 percent of the dealers in the Iowa study were moving approximately 75 percent of the volume of fertilizer.

Most of the people in the fertilizer industry are aware of the great variation in characteristics which exists among fertilizer dealers. Most of the industry would like to have dealers with high product knowledge, positive attitudes toward their product, progressive orientation toward service and merchandising techniques and those who move large volumes of fertilizer. The problem is how to get this type of dealer. A knowledge of the characteristics of those dealers that are moving relatively large volumes of fertilizer should suggest possible courses of action for the manufacturer of fertilizer who wishes to increase sales made by his dealers. The manufacturer or distributor wishing to do this has these alternatives, among others: (1) Concentrate on obtaining dealers with those characteristics highly related to volume of high volume fertilizer sales, (2) Consider the possibility of upgrading dealers who appear to have the potential.

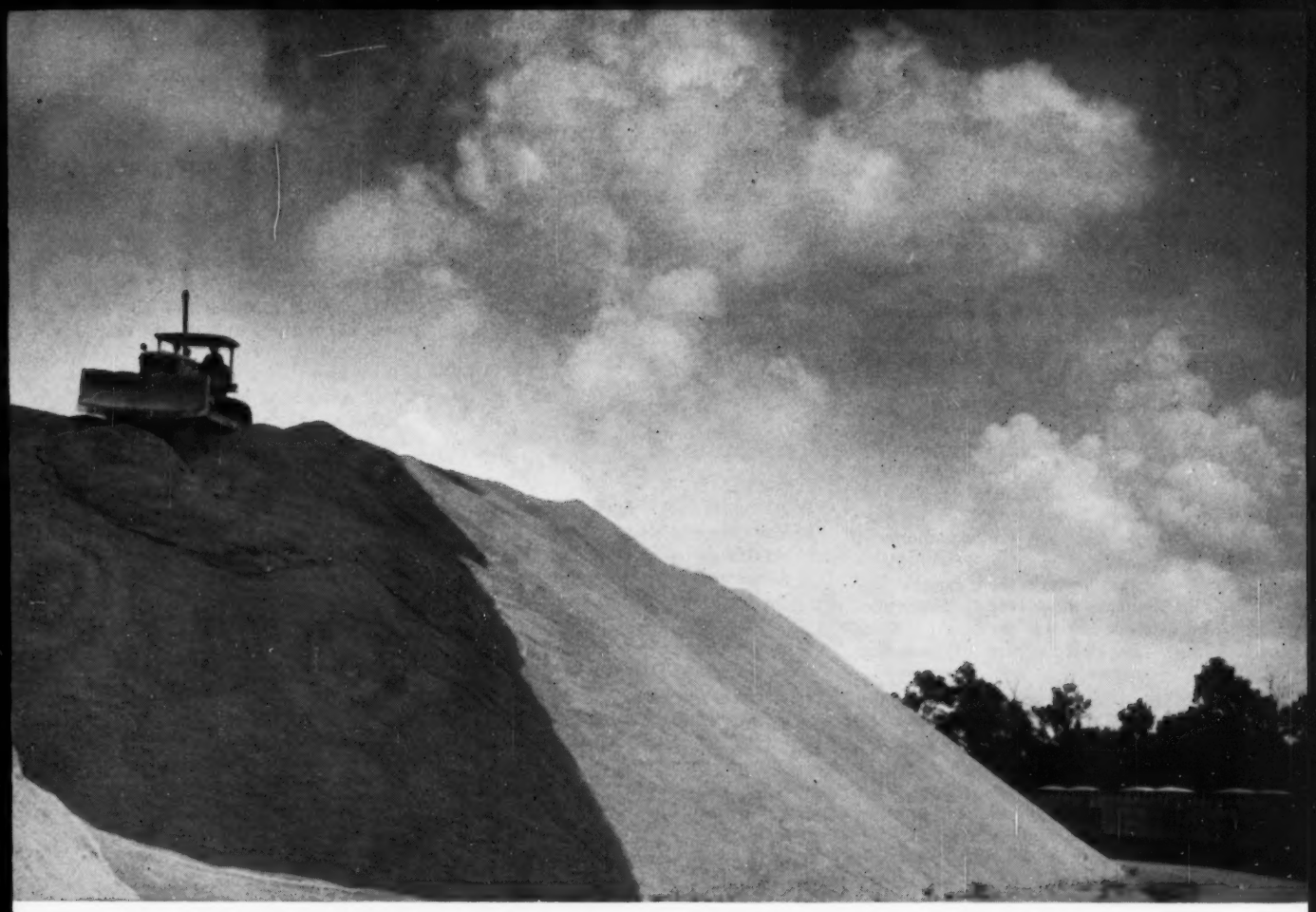
The Iowa Agricultural Experiment Station Study done in cooperation with the Tennessee Valley Authority, provides some data on characteristics that are significantly related to dealer dollar volume of fertilizer sales.

Fertilizer sales volume among the 18 dealers studied ranged from $500 to $330,000. The average for all dealers was approximately $45,600. What are the dealer characteristics that are significantly related to high dealer dollar volume of fertilizer sales? One type of answer to this question can be given by presenting the simple relationships (correlations) between selected dealer characteristics (variables) and dealer dollar volume of fertilizer sales per dealer.

However, before presenting the findings that may help answer the above question, several cautions must be stated:

1. While approximately 40 variables were related to dealer dollar volume of fertilizer sales, no claim is made that these are all of the important dealer variables that should be considered. The present analysis is limited to the variables available in this study.
2. Simple correlations, or the more complex multiple regressions, do not necessarily represent cause and effect — they are

Data in this paper are taken from Iowa State University Experiment Station Project No. 1352 done in cooperation with the Agricultural Economics Branch, Division of Agricultural Relations, Tennessee Valley Authority. The project is under the co-leadership of George M. Beal and Joe M. Bohlen, Professors of Rural Sociology, Department of Economics and Sociology, Iowa State University. Data analysis was under the supervision of graduate assistant Larry Campbell, assisted by graduate assistant research team members Larry Kasperbauer, Daryl Hobbs and Richard Warren.



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statements of relationships of predictive ability. There may be no necessary logic that relates the specific variable to dollar volume. However, it may be highly related to a second variable that can be logically related to dollar volume.

3. Where there is a broad range, and in general a normal distribution, in the dependent variable (dealer dollar sales volume) high relationships (correlations) can be obtained only where there is a relatively similar distribution in the other variables. For instance, it is difficult to obtain a high correlation between dollar volume of fertilizer sales and the dealer characteristic "help farmer customers plan their fertilizer program" because most of the dealers stated they offered this service.

The following characteristics were all found to be significantly related to dealer dollar volume or fertilizer sales. They are presented in declining order of their significance —the most highly related characteristics are presented first, those with the lower statistical significance are presented last. However, it should be remembered that all of the factors are significantly related to dollar volume of fertilizer sales.

For those with some statistical interest, it may be noted that the correlations ranged from a high of r .56 down to r .16. (1.00 being a perfect correlation). The correlation needed for .05 percent level significance is r .16 and for the .01 level of significance is r .23.

1. Total business volume of the dealer. It should be pointed out that this correlation is "biased" upward since fertilizer volume is included in total volume of business. However, fertilizer was the major product line of only 9 percent of the dealers. Fertilizer volume made up 30 percent or over of the total volume of business of only 14 percent of the dealers. (A subsequent analysis presented in this paper will statistically control for the effect of total volume of business and present the relationship of the dealer characteristics to fertilizer dollar sales).
2. The use of fair displays, direct mailing and "hand-outs" as promotional devices. Though it is doubtful that these techniques in themselves are major contributors to fertilizer sales, they may well be indicators of a type of promotional activity that is highly related to large sales volume.
3. Bulk application of fertilizer
4. The type of business: cooperatives, corporations, sole proprietorship and partnerships in that order.
5. The degree to which the dealer sees himself as being more change oriented than his farmer customers. Those who saw themselves as being much more change oriented than their customers were selling the highest volume of fertilizer.
6. The sponsoring of fertilizer clinics as an educational promotional technique.
7. Applying liquid fertilizer.
8. The percent that fertilizer is of total volume of business. This is a measure of the economic role of the fertilizer department in the total business.
9. Dealer knowledge of fertilizer & fertilizer use.
10. Dealer perception of his role as a consultant on fertilizer matters and as having the responsibility to make recommendations regarding the amount, analysis and methods of applying fertilizer.
11. Sending in soil samples for farmers.
12. Using advertising as a merchandising technique.
13. Using of fertilizer demonstration plots for educational and promotional purposes.
14. The offering of seasonal and self-haul discounts on fertilizer.
15. Being progressively oriented toward new merchandising techniques.
16. Interpreting soil test results to farmers.
17. Helping farmers plan their fertilizer program.
18. Taking soil samples.

The above factors are all significantly related to dealer volume of fertilizer sales. They are correlations which represent the simple relationship between each of the characteristics and fertilizer volume. Another, more sophisticated technique, called multiple correlation, can be used to determine the predictive ability of each of the characteristics, while controling on the effect of the other variables. In this case, the variable being predicted is dealer dollar volume of fertilizer sales. When all of the characteristics analyzed are combined in their relationship they account for more than 70 percent of the variation in dollar volume of fertilizer sales.

Again, it should be pointed out that predictive ability does not necessarily imply cause and effect.

The following characteristics are presented in order of their ability to predict dealer volume of fertilizer sales.

1. Total business volume of the dealer.
2. Percent fertilizer department is of total volume of business.
3. The use of fair displays, direct mailing and "hand-outs" as promotional devices.
4. Bulk application of fertilizer.
5. The sponsoring of fertilizer clinics as an educational, promotional technique.
6. The dealer's perception of his role as a consultant on fertilizer matters and having the responsibility to make recommendations regarding the amount, analysis, and methods of applying fertilizer.
7. Dealer knowledge of fertilizer and fertilizer use.
8. Application of liquid fertilizer.
9. The offering of seasonal and self-haul discounts.
10. Progressive orientation toward new merchandising techniques.
11. The use of advertising as a merchandising technique.
12. Sending in soil samples for farmers.
13. Using fertilizer demonstration plots for educational and promotional purposes.

It can be seen from the above rank order of variables that total volume of business of the dealer is the characteristic that correlates highest and contributes the most to the prediction of dealer's fertilizer sales volume. However, it has been indicated that total volume is "biased" upward, or in other words, it has a certain amount of "built-in" relationship, since fertilizer volume is a part of total volume of business. Another statistical technique will allow one to remove the effect of this bias and investigate the relationships on a purer basis. When this analysis was completed it was found that approximately 60 percent of the variation in dealer volume of fertilizer sales could be predicted.

When the effect of total volume of business (including fertilizer sales) is "partialed out" the following characteristics were found to be significant predicters of dealer dollar volume of fertilizer sales. They are listed in order of their predictive ability.

1. Percent fertilizer is of total volume of business.
2. The use of fair displays, direct mailing and "hand-outs" as promotional techniques.
3. Bulk application of fertilizer.

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You'll enjoy doing business with Swift's Phosphate Center . . . with dedicated people who want to serve you and are backed by the facilities necessary to serve you. Have a Swift Phosphate Center Representative outline the advantages Swift's service offers you in phosphates—triple, phosphate rock or ground phosphate rock.

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4. The sponsoring of fertilizer clinics as an educational, promotional technique.
5. The dealer's perception of his role as a consultant on fertilizer matters and having the responsibility to make recommendations regarding the amount, analysis and methods of applying fertilizer.
6. Application of liquid fertilizer.
7. Sending in soil samples for farmers.
8. Progressive orientation toward new merchandising techniques.
9. Knowledge about fertilizer and fertilizer use.
10. The offering of seasonal and self haul discounts.
11. Using advertising as a merchandising technique.
12. The use of fertilizer demonstration plots for educational and promotional purposes.

Certainly these findings should not be regarded as the final answer. They are subject to the limitations stated at the beginning of the presentation of findings. The relationships between the characteristics and dollar volume of fertilizer sales are just that —**relationships** not necessarily casual factors. The predictive ability of variables are just that —**predictive** of fertilizer volume, but not necessarily casual. Certainly not all of the possible, nor even the most important, characteristics of dealers have been analyzed here. However, a number of highly significant relations were found. And, these characteristics will predict from 60 to 70 percent of the variation in dealer dollar fertilizer sales volume. Within, these stated limitations, the discussion in this article should give insights into some of the characteristics of dealers that are moving relatively large amounts of fertilizer. At their best, these data may provide the basis for sounder planning in relation to dealer selection and training. At their least, this discusison should indicate the role of additional research of this general type which should provide sounder guide lines for decision making, planning and action to bring about increased and efficient fertilizer sales.

Lester Loving, Aetna Casualty & Surety Company, right, presents six year safety award to Federal's Louisville Production Manager, Jay Marshall, center, as Federal Production Engineer John Surber looks on.

Federal Chemical Wins Safety Award

The Louisville, Ky., plant of Federal Chemical Company has received an award for over six years without a lost time accident from the Aetna Casualty & Surety Company. Lester Loving, engineer for Aetna, presented the award to Jay Marshall, production manager of Federal's plant.

Sam E. Shelby, vice president in charge of production at Federal complimented the Louisville plant's staff and pointed out the fine example set by them for the other divisions of the company. He added that as of March 21, 1961 the record stands at a total of 2277 days without a lost time accident and represents better than 500,000 total man hours.

RESEARCH BRIEFS

Early cut hay contains more minor elements than late-cut hay, according to University of Wisconsin research. They suggest as a compromise between total yield and minor element content is to cut when alfalfa is in about the 1/10 bloom stage.

Rangeland fertilization has been the subject of a study by Montana's Red Bluff research ranch. The results indicated a need for further study—but the findings would be worth sending for. Write Dr. George Van Dyne, of Montana State University.

Tennessee farmers are not using enough lime and not enough plant food of the right kind, according to the Plateau and the West Tennessee Experiment stations.

Sugar Beet production in Colorado has been greatly increased in the past 15 years. The Great Western Sugar Co., Denver, has made a long study and will be glad to share the results with others. Their agronomist, F. B. Smith says the use of N per acre has increased at least 20 times since 1945.

$100,000,000 of additional cash could come to farmers if they would use recommended quantities of fertilizer. This statement, made by W. R. Thompson, of the Mississippi AES, is based on a study of one county-projected for the US.

Winter pastures—do they pay? Auburn's Dr. Howard T. Rogers summarizes their study on the subject in a fine report which may be briefed to Yes.

Coastal bermuda takes a lot of potash out of the soil, and periodic testing for potash content is recommended by Clemson's G. R. Craddock.

Molten sulphur as an agent to increase availability of phosphorus in rock phosphate, and of certain trace elements will be conducted by the University of Wisconsin, under a grant from the Sulphur Institute.

Texas soil pH could be adjusted by the use of sulphuric acid, it is suggested by Texas AES, Dr. Donald Longnecker. Continued use in irrigation water has demonstrated it will reduce crusting and clodding in the soil surface.

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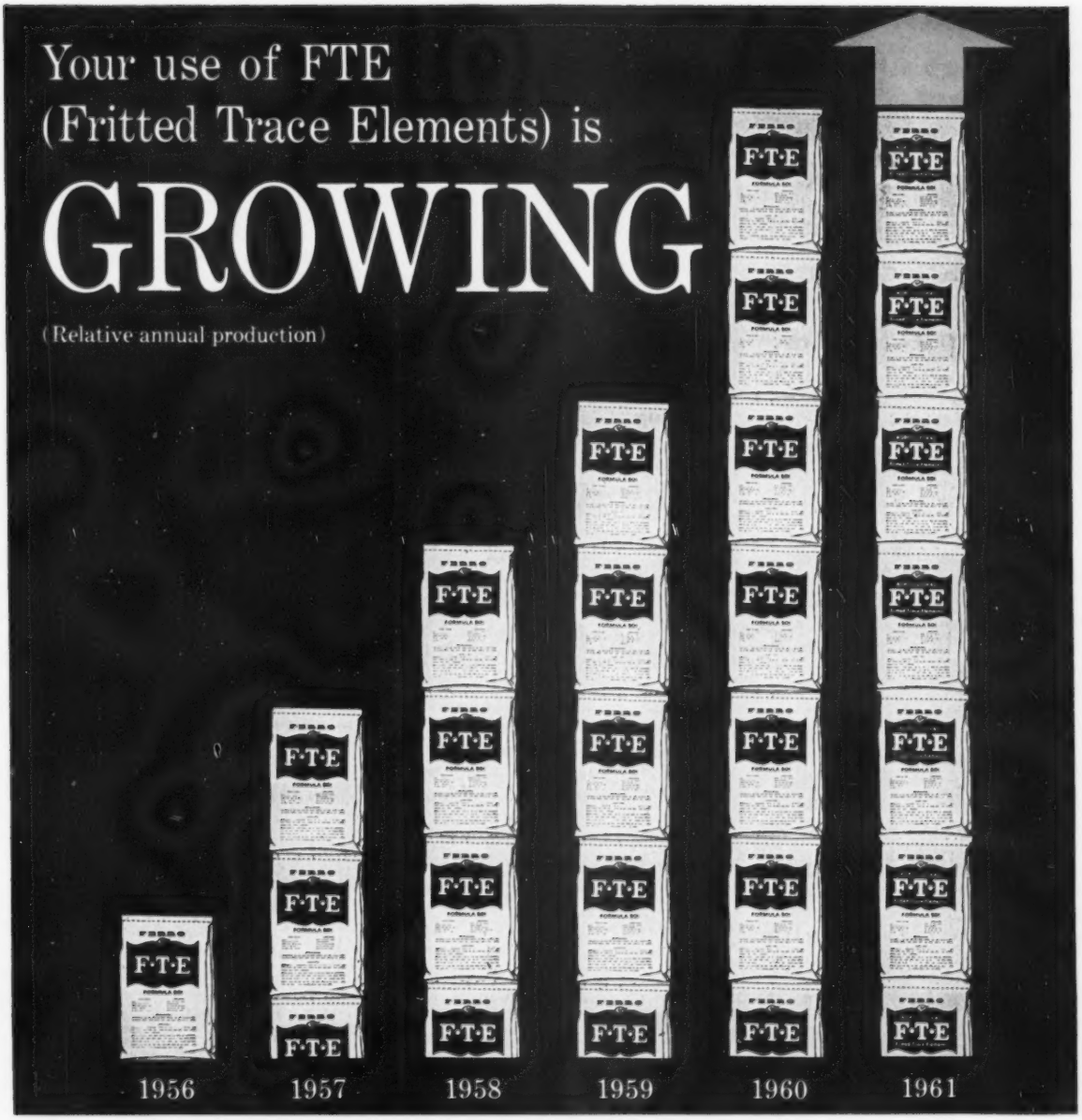

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THE INTERNATIONAL SCENE

AUSTRIA

Uptrends continued in '60

Austria's chemical industry at present holds the third position in production value among the country's major industries. Between 1953 and 1959, the output of the chemical industry increased by 109pc, while the increase in labour absorbed over the same period figured at only 45pc. A considerable expansion was recorded in particular in the production of fertilizers and plastic materials. Fertilizer production was greatly aided by the delivery of gas available from metallurgical works.

Austria's production of fertilizers grew from 760,000 tons in the first ten months of 1959 to 780,000 tons in the similar period last year.

BRAZIL

Capacities being expanded

Production of fertilizers in Brazil in 1959 comprised 205,238 metric tons of phosphate rock, 179,622 tons of superphosphates, 5,050 tons of ammonium sulfate, and 47,042 tons of "Nitrocalcio," a mixture of ammonium nitrate and dolomite. The 1959 output of all products was substantially higher than in 1958. Of the phosphate rock produced, 157,923 tons were used in making superphosphates; the remainder was ground and used directly as fertilizer. Capacity for milling crude phosphates is being expanded to 350,000 tons by the leading producer. Two companies are planning to manufacture triple superphosphate, one in 1961 and the other by 1964 or 1965.

DENMARK

Big N plant planned

Plans have been announced for the construction of a fertilizer nitrogen plant at Grenaa on the east coast of Jutland. The new factory, scheduled for completion in 1963, will be controlled jointly by a Norwegian nitrogen company and a Danish fertilizer firm, and will be operated by a subsidiary of the two firms. Annual capacity will be 75,000 metric tons of ammonium nitrate and 10,000 tons of liquid ammonia.

EIRE

Subsidy to step up potash use

The Government of Ireland on September 1, 1960, introduced a subsidy on the use of potash in fertilizers of 22 cents a ton of K_2O either in a mixed fertilizer or as potash alone. This subsidy is in addition to one on phosphatic fertilizers that has been in effect for some time. Response to potash application on all crops and grassland has been good, and consumption is expected to increase as a result of the new subsidy. Ireland is among the smallest users of fertilizers in Europe, although consumption has expanded considerably in recent years. The trend has been toward complete mixed NPK fertilizers, but many farmers purchase separate materials and do their own mixing because of more favorable price differentials for the separate materials.

INDIA

A fertilizer plant in every state

Manubhai M. Shah, Union Minister for Industries, disclosed that every Indian State would soon have a fertilizer factory and the production of nitrogen in India was expected to go up to 1 million tons by the end of the third Plan.

Under the programme of heavy industries concentrated at Ranchi in Bihar a new unit with a capacity of 1 million tons of steel would be set up every year and by the end of the third Plan nearly 75% of the industrial machinery of all kinds would be produced in India.

Referring to the rich mineral resources and the vast manpower in India, Mr. Shah said that it was an irony of fate that in spite of the bounties of nature, the per capita income in India should be the lowest in the world. The only way India could advance industrially was to use modern techniques of production.

Standardized plants

An FAO fertilizer industry survey mission has recommended that fertilizer plants to be put up in the country during the third Plan should be of uniform design, so that the plants and spare parts could be manufactured in India.

* * *

$140,000,000 proposal

A plan calling for four new fertilizer plants in India to be built by the United States for an international development agency at a cost of $140,000,000 was presented to Kenneth Galbraith, U.S. ambassador to India, by Dr. Raymond Ewell, vice chancellor for research at the University of Buffalo.

Fifty-five million dollars of the cost would be supplied by the U.S. Government under the plan, Dr. Ewell said, and $85,000,000 by the Indian Government or other sources in India.

Dr. Ewell submitted his proposal, designed "to make a real impact on India's fertilizer production problem" after a five month period in India as a consultant.

ITALY

Italian fertilizers have cost edge

Production of fertilizers in Italy in 1959 included 2,403,000 metric tons of nitrogenous materials, 1,853,000 tons of phosphatic materials, and 925,000 tons of mixed and compound fertilizers. The 1959 output of nitrogenous materials and mixed fertilizer represented substantial increases over 1958, but phosphatic materials declined slightly. Estimated capacities for the 3 types are 3,400,000 tons, 2,600,000 tons, and 1,300,000 tons, respectively. Potash is not produced, but preparations to develop large deposits in Sicily are under way. Delivery of fertilizers to agriculture, which closely reflects consumption, totaled 1,211,000 tons of nitrogenous materials, 1,338,000 tons of phosphatic materials, and 794,000 tons of mixed fertilizers in 1959. Exports account largely for the marked differences between production and deliveries, especially in nitrogenous materials. The outlook for fertilizer consumption is favorable. The average use of fertilizer per hectare of cultivated land is lower than in many other European countries. A continuation of substantial export trade is expected inasmuch as low production costs and low export prices give Italian fertilizers a competitive advantage in many foreign markets.

MOROCCO

Strike slowed 1960 production

Phosphatic fertilizer production in 1959 consisted of 80,000 metric tons of superphosphate and 40,000 tons of "hyperphosphate" (finely ground raw phosphate rock). Of this output 70,000 tons of superphosphate and 32,000 tons of "hyperphosphate" were distributed for domestic consumption; the remaining 10,000 and 8,000 tons, respectively, were exported. Morocco has capacity to produce 150,000 tons of superphosphate and 140,000 tons of "hyperphosphate" annually. A strike in the producing plant, which began in October, retarded 1960 production.

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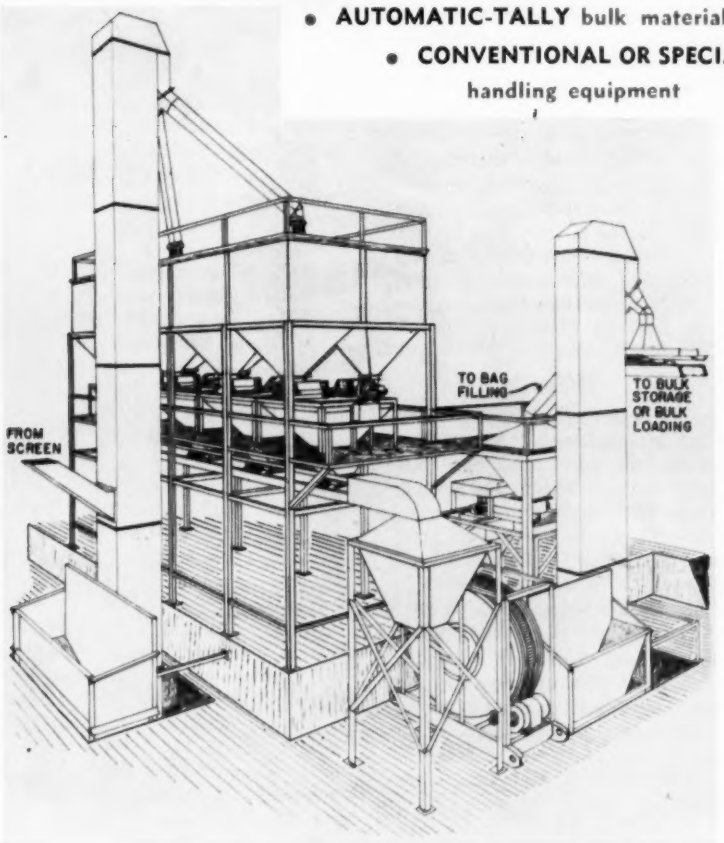

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AUGUSTA, GEORGIA

INDUSTRY PEOPLE

US Borax

Election of Benjamin R. Pickering as assistant secretary of United States Borax & Chemical Corporation is announced by Hugo Riemer, company president.

McCloskey

Frazer

Mr. Pickering has been with U. S. Borax and its predecessor company, U. S. Potash, since 1951—serving in various sales executive capacities. As assistant secretary of the corporation, he will be located in the New York office.

Dr. A. L. McCloskey has been appointed to the newly created position of associate director of market development and technical service it is announced by J. F. Corkill, vice president in charge of marketing.

Dr. McCloskey was formerly associate director of chemical research of U. S. Borax Research Corporation at Anaheim, Calif. He assumed his new duties in the New York office of U. S. Borax on April 15.

Barry A. Frazer has been appointed sales representative for U. S. Borax in Texas, Oklahoma and New Mexico, it is announced by W. J. Dibble, director of marketing.

Bunker Hill

The Bunker Hill company has announced the promotion of George A. Larson to the newly created position of sales and traffic manager, Kellogg, Idaho, operations.

Mr. Larson, with Bunker Hill since 1948, will direct sales and marketing of sulphuric and phosphoric acids and manage over-all-traffic operations for the company. His appointment fills a vacancy created by the resignation of Bunker Hill sales manager, E. A. Torney.

Sims Farm Bureau

James Hickman, for four years a supervisor at the Sims Farm Bureau fertilizer plant, has been made assistant manager.

Collier Carbon

Wm. C. Kaesche has been elected president of Collier Carbon and Chemical Corporation. Previously executive vice-president Mr. Kaesche succeeds Robt. T. Collier who moved up to chairman of the board of directors.

Dudley Tower, president of Union Oil Company, was elected a member of the Board of Directors to fill the vacancy created by the retirement of the former chairman, W. L. Stewart, Jr.

Paul Foreman, formerly treasurer and assistant secretary, replaces Howard W. Wright as secretary. Mr. Wright continues as a member of the board of directors. Two new corporate officers, Jay Linderman and Ray Farthing, were also named. Mr. Linderman, now treasurer, and Mr. Farthing, now assistant secretary, will fill the two positions previously held by Foreman.

IMC

The agricultural chemical division of International Minerals and Chemical has announced two personnel changes: Ralph M. Brown, who has been operations manager, has become a member of the staff of vice-president D. J. Stark, and will move to Skokie; his post will be filled by Sherman A. White, who has been manager of production.

S. A. (Alex) Scott has been appointed chief mining engineer and Frank C. Pickard manager of prospect development in the Mining and Exploration department of International Minerals & Chemical Corporation.

F. C. Kruger, director, also announced the appointment of Dr. Donald H. Freas as geologist and David M. Williams as mining engineer.

Valiant Fertilizer

Valiant Fertilizer Co., Laurel, Delaware, has announced two vice-presidents: Roland T. Lowe, Jr., in charge of administration; J. Herman Cubbage, in charge of sales.

Webfoot Fertilizer

Merle F. Carlson, agronomist, has joined Webfoot Fertilizer Co., Portland, Oregon, on the sales staff.

Raymond Bag

Raymond Bag Corporation has announced that Al P. Wolff has become associated with the firm's New York City sales office. He will be contacting accounts in the area in addition to those in Metropolitan New York.

Wolff

AP&C

Leonard L. Lyle has joined the Shreveport district office of American Potash & Chemical Corporation as a sales representative, it was announced by Niven D. Morgan, Jr., district sales manager.

Edward O. Carlton has been appointed sales representative for AP&C with headquarters in Kansas City, Mo., it was announced by John L. Anderson, Chicago District sales manager.

Arizona Fertilizer

Arizona Fertilizer and Chemical Co., Phoenix, Ariz., has announced the following executive changes:

Ted W. Swift, with the firm since 1938 and who has been serving as executive assistant in charge of production, promoted to vice president.

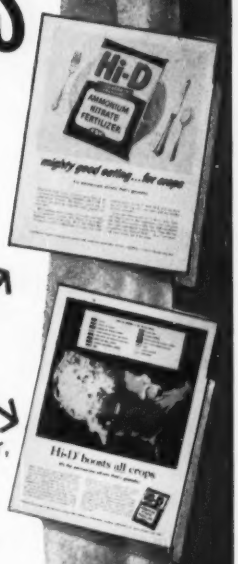
Joseph G. Hartsig, who joined the firm in 1948 and has been executive assistant in charge of purchasing and product development, named assistant vice president.

Dr. John E. Chilton has been named director of research and development, with headquarters in Phoenix. The announcement was made by Frank M. Feffer, Sr., president, who said that Dr. Chilton will coordinate the services and activities of the company's technical department.

Best Fertilizer

Dr. W. L. Garman, vice president of The Best Fertilizer Co., Lathrop, California, has announced two appointments: Lisle W. Garner to the newly created post of assistant sales manager, working on development of their new crop chemicals department; Al Nilsen, engineering advisor to devise and standardize the mechanics of handling and application of crop chemicals.

A BAGFUL OF WAYS TO BOOST Hi-D® SALES



IN '61 The idea of Hi-D is catching on. More farmers, more ranchers, more growers are using ammonium nitrate in granular form—using Hi-D as a supplement to your mixed fertilizers. Read how CSC is spreading the news about Hi-D and backing up your own sales efforts throughout '61.

MAGAZINES feature these informative ads, explaining the many advantages of Hi-D.

In full color in Progressive Farmer, Farm & Ranch and Successful Farming.

And in black and white in Florida Grower & Rancher, Prairie Farmer, Citrus & Vegetable Grower and Rice Journal.

TV SPOTS on farm programs of 18 stations demonstrate the free-flowing action of Hi-D.

RADIO SPOTS on 75 stations are a frequent nudge to farmer's memory.

BILLBOARDS in 879 high-traffic locations throughout South and Midwest enlarge 'Mighty Good Eating' theme.

OUTSIDE THE STORE Attractive metal sign and Hi-D clock-type thermometer (attention guaranteed!) bring the Hi-D buyer to your store.

INSIDE THE STORE Window streamers echo theme of 'Mighty Good Eating'; packages of samples, product folder and counter displays keep customers thinking Hi-D.

CSC

John Deere Chemical

Dr. L. E. Craig has been named to the newly created post of director of research and technical service for John Deere Chemical Company.

Dr. Craig will be in charge of all phases of research and technical services for both the Pryor and Tulsa plants.

He will be in charge of such functions as market research and development, customer technical service, product and use research, process research and development, new product research, agronomic research and services, and quality control and analytical services.

Dr. Craig has been with Deere & Company's chemical division, formerly Grand River Chemical Division, since early 1954. He has been director of research since 1956.

Valley Nitrogen

Sherman Thomas of Madera was reelected as chairman of the board of directors at the annual shareholders meeting of Valley Nitrogen Producers, Inc.

Other officers retained are Carl H. Haas, Fresno, president; Roland F. Hill, Fresno, vice president, and Mal Carberry, Fresno, secretary-treasurer.

Four directors were renamed to three year terms. They are Sam Hamburg, Los Banos; Jack Harris, Five Points; John J. Elmore, Sr., Brawley, and Carl Blaser, Yuba City.

Olin

William Block, 56, has retired from Olin Mathieson Chemical Corporation, it was announced by John O. Logan, vice president and general manager of the corporation's chemical division.

Mr. Block, vice president and manager of the chemical Division's Blockson operations, joined Blockson as a salesman after graduating from the University of Illinois in 1928.

Blockson Chemical Company was founded by John W. Block and his three sons, Louis, Edward and William, in 1926.

Young Machinery

The appointment of B. Clay Lee as a sales engineer for Young Machinery Company, has been announced by H. T. Young, president. Mr. Lee will be responsible for the sale of Young & Robinson type process machines and pneumatic systems throughout New York State and New England.

ASA

Dr. Matthias Stelly, formerly professor of soils at Louisiana State University, has been named executive secretary of the 4,350-member American Society of Agronomy.

Stelly

Dr. Stelly will be in charge of the ASA central office which has been located in Madison, Wis., since 1948. One of his first tasks will be supervising construction of a new office building for the society and its 11 full-time employees. He will also serve as publications director for the crop and soil research and educational journals published by the organization.

Affiliated with the ASA are the Crop Science and Soil Science Societies of America. Membership includes scientists in more than 80 other countries.

Dr. Stelly succeeds L. G. Monthey who had served as ASA executive secretary since January 1948 and who is now employed as extension resource development specialist with the University of Wisconsin.

Meissner Engineers

Meissner Engineers, Inc., Chicago has announced the appointment of Frank L. Giordano to the position of vice president.

Mr. Giordano, who brings to the company 20 years experience in the chemical industry, served as director of engineering of Velsicol Chemical Corporation prior to joining MEI. He has frequently served the American Management Association as a seminar chairman, lecturer and discussion leader in its various plant management and technical organization programs for industry.

Before joining Velsicol, Giordano served in engineering and plant management positions with various divisions of General Mills, Inc., General Aniline and Film Corporation, General Chemical Co. and E. F. Drew and Company.

Pittsburgh Plate Glass

Appointment of J. Earl Burrell as vice president of operations for the chemical division of Pittsburgh Plate Glass Company was announced by Joseph A. Neubauer, vice president and general manager of the division. Mr. Burrell had served as general manager of operations since 1958.

Waco-Porter

John B. Gagnon, 38, a veteran of twelve years in the agricultural sales field with Smith-Douglass, Inc., of Albert Lea, Minn., has joined Waco-Porter Corporation of Minneapolis as sales manager for "Porta-Green" portable plastic greenhouses, a new patented product line manufactured by Waco-Porter and being sold in the United States for the first time this year.

Mr. Gagnon will be in full charge of developing U. S. markets for the new product line, establishing sales patterns, and supervising advertising and sales promotion.

Owens-Illinois

The Multiwall Bag Division of Owens-Illinois Glass Company has expanded its sales organization by the addition of three new sales representatives, J. R. Murphy, general sales manager, has announced.

Alvin L. Wistert has been assigned to the Western sales region with headquarters in Chicago; William E. Wehner, Jr., to a new sales territory covering southern Ohio, southern Indiana and Kentucky with headquarters in Louisville; and Kenneth J. LaMontagne to the Eastern region in New York.

Mr. Wistert has been in industrial sales work in Detroit for the past six years.

Mr. Wehner has been connected with multiwall bag sales for the past seven years in Atlanta.

Mr. LaMontagne moves to New York from Valdosta, Ga., location of the O-I multiwall bag manufacturing facility.

Obituaries

Paul S. Brallier, technical advisor to the president of Stauffer Chemical, died March 29 in a New York hospital. He had been with Stauffer for 45 years.

Edward H. LaFleur, 56, industrial relations manager, nitrogen products division of W. R. Grace & Co., died of an apparent heart-attack while golfing with friends April 14.

Moshe A. Novomeysky, 88, whose research opened up use of the Dead Sea's minerals to Israel, died in Paris, March 31. He was head of the Dead Sea Works, Ltd.

Malcolm Frederic Wharton, Sr., 65, retired partner of Arizona Fertilizer and Chemical Co., Phoenix and past president of the Arizona Agricultural Chemical Society, died March 23 in a Chicago hospital, following a long illness.

ALABAMA

Armour's $25,000,000 fertilizer plant near Muscle Shoals has been delayed in construction due to the unusual rains in that section. Early last month they were watching the barometer, hoping to get under way very soon.

ARKANSAS

Hartz Fertilizer Company, Stuttgart, is a subsidiary of the Jacob Hartz Seed Company, founded in 1925. They have built, and expect to be in operation this month with a $60,000 fertilizer plant designed primarily to do a bulk fertilizer business. This, they believe, is the future of the industry.

However, the plant has sacking facilities, and will also offer 32% N solution, with anhydrous and liquid mix in the future, if demand develops.

The Jacob Hartz concern is owned by Mr. Hartz and his five sons with Jake Hartz, Jr. serving as general manager.

CALIFORNIA

Ortho Division is about ready to move into its new warehouse and office building, near Riverside. Occupying a three acre site, the building has 7200 square feet of interior space. The present Riverside branch will be housed there, and the company expects this relocation will expedite service to the Pomona-Ontario-Riverside-San Bernadina area. The project is costing some $70,000.

FLORIDA

Pasco Packing, Dade City, had a bad fire April 6, which did thousands of dollars of damage, according to Morton Howell, superintendent of the fertilizer division.

The fire broke out at night, and was quickly reported by the watchman. Firemen, wearing gas masks, reduced the smoke enough so that lift trucks and tractor shovels were able to move out much packaged goods and material.

Local sources praised the well-organized response of Pasco workers, beginning with the company nurse, who promptly set up to care for any victims (of which there were none) and the workers were on hand to carry out fertilizer endangered when it was safe for them to do so, and auxiliary lights came into use as the high voltage lines were cut off as a precautionary measure. B. Hargrove is chief of plant security.

IDAHO

J. R. Simplot will begin June 1 the job of moving to Pocatello the entire fertilizer plant which they recently bought from Anaconda Copper. The plant is located at Anaconda, Montana. It is expected to be in operation at the new site within 90 days of the moving start.

This is part of a multimillion dollar program by Simplot to expand their production at Pocatello. The moved plant will give them big ammonium phosphate capacity, and they will also expand their phosphoric acid facilities. The result will be an expansion which may nearly double their productive capacity.

ILLINOIS

Sangamon Grace Ammonia is building an anhydrous ammonia storage tank and compressor at Decatur, with 30,000 gallons capacity.

* * *

Olin (formerly Olin Mathieson; see Changes last month) are licking the cold problem in construction of their new phosphoric acid facility at Joliet. A giant plastic bubble, kept inflated by air blowers, and heated inside permits men to work in reasonable comfort.

IOWA

Ortho Division has let additional contracts for its $22,000,000 project at Davenport. These include what is to be the largest mechanized fertilizer warehouse in the U.S. and construction of the administration building and locker facilities.

The warehouse size compares roughly to the size of the Capitol Building in Washington, without the rotunda, according to J. Q. Cope, vice-president of new facilities. It will cover 2.7 acres, about as tall as an 8 story building and will have a fertilizer storage capacity of 70,000 tons.

The Fort Madison plant, nearing completion, will represent the largest single investment in the world in the chemical fertilizer industry.

LOUISIANA

Pelican State Lime Corp., Morgan City, is expanding $500,000 worth to include production of agricultural lime and other products, according to its president, Anthony J. Guarisco.

MARYLAND

W. R. Grace is installing new facilities, valued at $500,000 at their central research facility in Clarksville, to handle the expanded activities of the new product development and agricultural chemicals research departments.

The 6,000 square foot New Product Development building will be devoted to meeting the application work requirements of new products which originate in other research departments at the center.

A second structure recently located on the grounds of the Washington research center is an all-aluminum greenhouse, one of the first of its kind to be situated in this area. The agricultural chemicals research department will use this unique structure primarily for fertilizer research, however, other types of application work may be done on the premises. The spacious greenhouse has room for several thousand plants and will have the latest in temperature control devices in order to minimize attention required during off-duty hours.

MISSISSIPPI

Mississippi Federated Cooperatives will spend some $200,000 to modernize the fertilizer plant at Hattiesburg which they recently purchased. Clover Brand pelletized lime base fertilizer is to be produced there.

OHIO

Kingsbury & Co. suffered a fire which damaged a loading dock and one of their two warehouses, containing bagged fertilizer. At the time, officials could not estimate damage.

Farm Bureau Cooperative units vie for honors as the plant with "outstanding performance in processing quality fertilizer. For the second consecutive year this honor was won by the Sims Fertilizer Plant, Mt. Gilead. In 1958 the Dayton plant won this award. An Award Dinner is held and the presentation formally made by an executive, this year John Makr, manager of the fertilizer manufacturing division.

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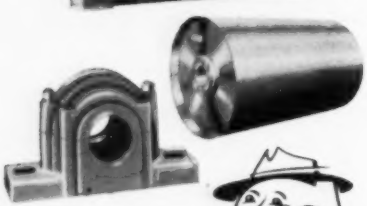

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SOUTH CAROLINA

W. H. Clark Ginning & Fertilizer Co., Johnston, suffered a fire which became devastating to the plant as chemical explosions followed each other in rapid succession. Nearby oil tanks were threatened by the blaze, and the community was frightened of the result. Firemen, aided by a rain and by the direction of the wind controlled the blaze in time.

TEXAS

W. R. Grace & Co. announced April 10 it will build a new ammonia plant in Big Spring, to supply fertilizer to the rapidly expanding agricultural area of West Texas.

William J. Haude, president of Grace's nitrogen products division said the plant will be producing early next year and is designed for more than 60,000 annual tons of ammonia. Foster Wheeler Corp., New York, will design and construct the plant.

Mr. Haude said the new plant will adjoin the oil refinery of Cosden Petroleum Corporation and will be operated for Grace by Cosden. Grace owns 53 per cent of the outstanding stock of Cosden.

Mr. Haude said the new plant will employ the recent advances in ammonia production technology developed by Foster Wheeler and practiced by Grace at its five ammonia installations.

News of the new plant follows by only a few weeks a Grace announcement of completion of increased ammonia production of 60,000 additional tons at one of its two ammonia producing facilities at Memphis, Tennessee.

* * *

Shamrock Oil & Gas will build at Dumas, adjacent to its McKee refinery, an ammonia plant capable of 150 daily tons. Production is expected by early next year.

UTAH

Texas Gulf Sulphur is letting contracts on its $30,000,000 new potash mining and processing plant near Moab. This is expected to produce, at the outset, 1,100,000 annual tons, which would make it the largest unit of its kind in the domestic field. The mine shaft, which is a 2800 foot production shaft, is under way, with contract let to Harrison International. Sterns-Rogers hold the contract for the milling plant and other surface facilities, as has been previously reported.

The leading sulphur producer, this is Texas Gulf's first move toward the diversification they have been considering for several years.

WASHINGTON

J. W. Chemical Co., Inc. has been chartered at Mount Vernon to manufacture, buy, sell fertilizers and other crop chemicals.

AUSTRALIA

A.C.F. and Shirleys Fertilisers have established a mixed fertiliser plant at Paget Junction, Mackay, with an investment of 180,000 pounds.

CANADA

Armour and Pittsburgh Plate Glass are working on test wells and a pilot plant for solution mining of potash near Moosejaw, Saskatchewan. If the test, to cost $1,000,000 is a success, a multi-million operation is to follow.

* * *

Border Chemical are entering into the second stage of their chemical complex in Manitoba, this time a $250,000 copper sulphate plant. The first step was a sulphuric acid operation.

BELGIUM

Fisons and Union Chemique Belge have predicted that by next Summer they will be producing 29 hourly long tons of a high analysis fertilizer in their new plant at Zanvoorde, Belgium. Using a new process, the plant will ship to Common Market nations, as well as within Belgium and exports overseas.

EIRE

Shamrock Fertilisers have put into operation their new $700,000 sulphuric acid plant at Wicklow, an extension of their program, initiated ten years ago, to produce granular grades for the Irish market. This new installation is capable of 35,000 annual tons of sulphuric acid, with which their total capacity can now reach 90,000 annual tons of superphosphate.

MEXICO

Compania Mexicana de Explosivos, DuPont wholly owned subsidiary, is building a sulphuric acid concentration plant designed by Chemical Construction of Britain.

PORTUGAL

Uniao Fabril do Azoto is building near Lisbon a fertilizer complex of which Kellogg and subsidiaries have the contracts for the ammonia and urea plants.

VENEZUELA

Aruba Chemical Industries is planning a $96,000,000 operation to produce fertilizer materials off the coast at Aruba.

The South Carolina Fertilizer Dealer

His Role In Agricultural Production

by D. E. Crawford

The Author

Mr. Crawford is associate agricultural economist at the Department of Agricultural Economics, South Carolina Agricultural Experiment Station, Clemson Agricultural College, Clemson, S. C.

Most of the recent studies of dealer functions in fertilizer distribution have been made in the new consuming areas of the midwest. Now we take a careful look at the dealer picture in a state which has long been a heavy user of mixed fertilizers and materials.

Many organizations, agencies and institutions are involved in the production, distribution and usage of fertilizer and fertilizer materials from the time they are manufactured until they are used by farmers. There are over 100 fertilizer-manufacturing plants in this state alone, with more than 600 dealers plus the numerous salesmen who make their products available to farmers.* Fertilizer manufacturers, mixers, distributors, dealers and salesmen perform invaluable services in meeting the complex needs of our producers. The Fertilizer Inspection Service has a vital role to play. Research and Extension personnel as well as vocational agricultural teachers and representatives of various other state and federal agencies are assisting farmers in their efforts to attain the "economic optimum" in the use of fertilizers and fertilizer materials.

This manuscript is concerned with one organization involved in the complex problem of the marketing and usage of fertilizers in South Carolina — the fertilizer dealers. These dealers are located throughout the state, therefore, fertilizer and fertilizer materials are available to farmers at all times and in most instances on a basis which is in accord with the needs and desires of the customer. Practically all dealers offer delivery service and in many instances are equipped to spread fertilizer directly on the land. These men also play an important role in financing fertilizer purchases and in the farmer's decision-making process regarding fertilizer use.

Source of Data

The basic data presented in this publication were obtained from fertilizer dealers throughout South Carolina. The study was a cooperative undertaking between the Departments of Agricultural Economics and Fertilizer Inspection and Analysis.

Detailed questionnaires were mailed to all fertilizer dealers in the state. Approximately 20 percent of the dealers returned the questionnaires. The information obtained was for the fiscal year beginning July 1, 1959 and ending June 30, 1960.

Dealers Who Sell Fertilizer

A brief analysis of selected economic and attitudinal characteristics will give insights into some of the positive and negative factors of fertilizer dealers.

Business Characteristics

Length of fertilizer dealership:

South Carolina fertilizer dealers are an experienced lot of business men. In response to a question asked "How long have you been a fertilizer dealer?" it was learned, for example, that only 4 percent of the dealers had been in business less than 10 years. Over one-half had been in business 30 years or more and 13 percent had been fertilizer dealers 50 years or more. The average length of service in the business for all dealers was slightly in excess of 25 years.

Type of ownership	Percent of dealers	Number years in fertilizer business
Individual	46	24
Partnership	25	34
Corporation	25	32
Cooperative	4	10

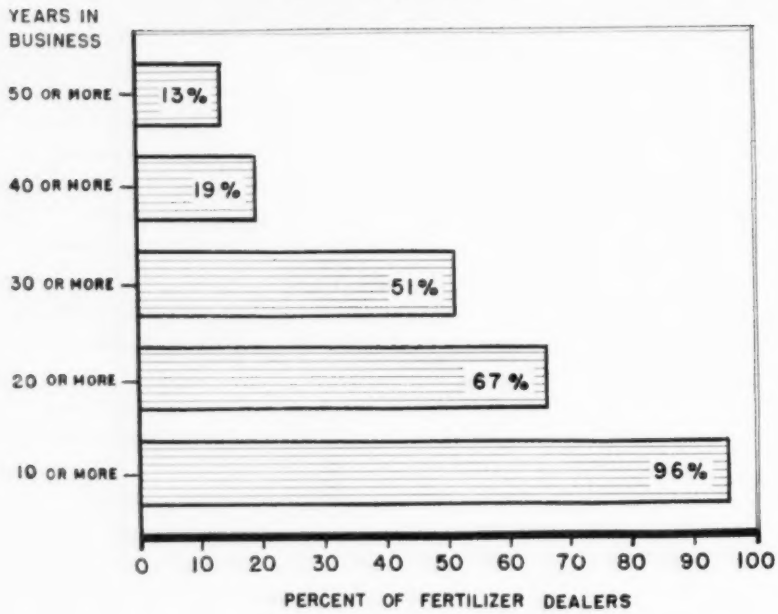
Type of business ownership:

Forty-six percent of the dealerships were owned by individuals, 25 percent were partnerships, 25 percent were corporations and the remaining 4 percent cooperatives. On the basis of number of years in business cooperatives were the youngest with an average length of service of 10 years. The range was from 4 years to 15 years as a fertilizer dealer. Partnerships were the oldest dealers on the basis of years of service, averaging 34 years. The range in years as dealers was from 15 to 60 years. Fertilizer dealerships owned by individuals averaged being in business 24 years and corporations 32 years.

* *Cloaninger, B. D.,* Inspection and Analysis of Commercial Fertilizers in South Carolina *S. C. Ag. Exp. Sta. Bul. 473, Oct. 1959, page 5.*

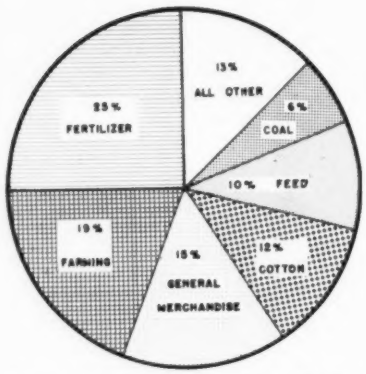
Note: All illustrations used in this article prepared by D. W. Bickley.

Two-thirds of South Carolina's Fertilizer Dealers have been in Business 20 years or More.

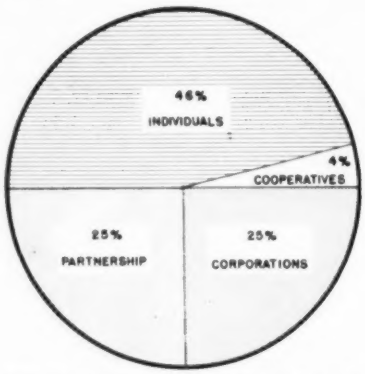


Major product line	Percent of dealers	Percent of fertilizer volume handeld	Number years in the fertilizer business
Fertilizer	25	40	30
Farming	19	15	30
General merchandise	15	9	31
Cotton	12	21	25
Feed	10	6	19
Coal	6	3	28
Other*	13	6	25

*Seven different product lines, no single product line constituting more than 4 percent of total dealers.



Almost One-half of All South Carolina Fertilizer Dealerships are Owned by individuals.



Sale of Fertilizer is the Major Business of South Carolina Fertilizer Dealers.

Major product line of dealers who sell fertilizer:

Fertilizer was the major product line of 25 percent of the dealers who responded to the questionnaire. These dealers accounted for about 40 percent of the total fertilizer sales and their average length of service was 30 years. The dealers in this group were therefore larger than average and had been in business longer than average. The second major product line of these South Carolina dealers was farming followed closely by general merchandising. Length of fertilizer dealerships averaged 30 and 31 years, respectively, for businesses in these groups. Cotton, feed, and coal were all important items in the total business done by fertilizer dealers in this state.

On the basis of number of years in the fertilizer business those dealers whose leading sales item was feed were the youngest with an average length of service of 19 years.

Number of companies represented:

Many of South Carolina's fertilizer dealers were not content to represent a single manufacturer and a substantial proportion of them (about 16 percent) do business for 6 or more. Nearly one-third of them represent 4 or more companies. They handled 45 percent of the total volume of fertilizer in 1959-60.

Number of companies represented	Percent of dealers	Percent of fertilizer volume handled
1	23	30
2	25	12
3	19	13
4	9	16
5	8	12
6 or more	16	17

Other business characteristics:

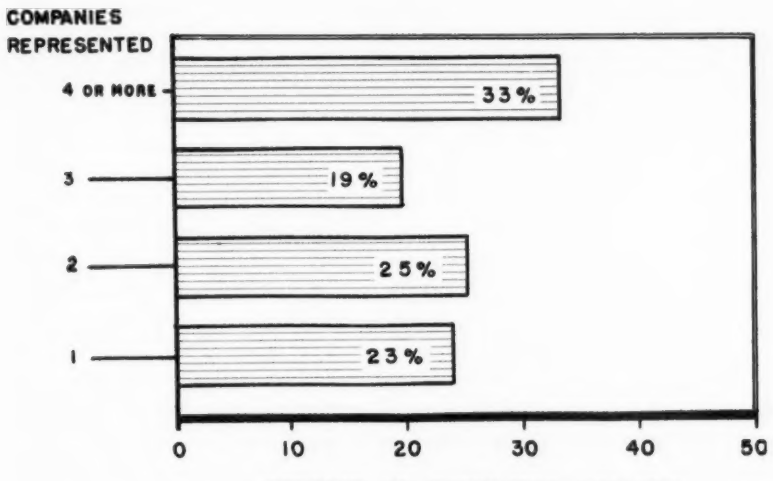
Among the dealers responding to the questionnaire, fertilizer sales volume ranged from $1,000 to $480,000. The average for all dealers was $46,304. However, one-third of the dealers sold less than $10,000 worth of fertilizer and two-thirds sold less than $31,000 worth each. Actually one-fourth of the dealers sold three-fourths of the fertilizer during the year ended June 30, 1960.

On the average, *fertilizer sales* made up approximately 25 percent of the total volume of all sales by these dealers.

The number of farmer customers who purchased fertilizer from any one dealer ranged from 9 to 1,500 with an average of over 200 customers per dealer. The average quantity of fertilizer purchased by each customer was approximately 6 tons.

The gross profit margins (mark-up from purchase price) reported by all dealers varied from 1 to 15 percent for cash sales and from 2 to 50 percent for credit sales. The average mark-up reported for cash sales was 7.69 percent and for credit sales 13.63 percent. (These averages do not include a few dealers who reported charges which represented the cash price *plus* 10 percent *plus* an interest charge *times* the number of months credit was extended).

Fifty-eight percent of the dealers reported that they realized less than 10 percent gross profit margins on cash sales, 29 percent reported an even 10 percent and the remaining 13 percent, more than 10 percent. Gross profit margins from credit sales were slightly higher than those realized on cash sales with only 25 percent of the dealers reporting that they charged less than 10 percent mark-up, 20 percent an even 10 percent and the remaining 55 percent more than 10 percent.



One-third of South Carolina's Fertilizer Dealers Represent 4 or More Companies.

DEALER PRACTICES AND OPINIONS

Attitude about mark-up charged:

Only 5 percent of the dealers thought that the mark-up they charged was "adequate" and another 29 percent said it was "barely adequate." Thirty-five percent of them felt that the mark-up they charged was "inadequate." These dealers handled 44 percent of the total volume of fertilizer. Another 12 percent indicated merely that they were able to "break even" with the mark-up they charged.

Dealer opinion about mark-up	Percent of dealers	Percent of fertilizer volume handled
Adequate	5	3
Barely adequate	29	22
Break-even	12	18
Inadequate	35	44
Adequate for cash sales but inadequate for credit sales	17	9
Adequate for credit sales but inadequate for cash sales	2	3

Role of fertilizer in total business:

As previously stated, a great majority of the fertilizer dealers interviewed were engaged in handling many and varied product lines in addition to the sales of fertilizer. Among other things the dealers were asked to evaluate the role of their fertilizer division in their overall plans.

3 percent of the respondents said their fertilizer division was "a good money-maker in itself"

25 percent indicated that it provided an important customer service

34 percent were of the opinion that it was essential for them to maintain their fertilizer department in order for them to compete with other businesses

50 percent stated that it was an integral part of their business organization

46 percent said they had been "in business so long it's hard to give up"

(The sum of these percentages exceeds 100 since many dealers reported more than one answer).

Business conditions:

Eight percent of the fertilizer dealers characterized their business as "hopeless" and 45 percent said it was "poor." Thus over half of the dealers responding to the questionnaire voiced considerable pessimism regarding their future in the business. However, 33 percent of them indicated that the fertilizer business was "average"; 8 percent evaluated their business as "good" and 6 percent as "very good." Twenty percent of the fertilizer volume was sold by the 14 percent of dealers classifying business as "good" and "very good."

As a general rule, dealers who have been in business a shorter length of time reveal a more optimistic view of business conditions. For example, those who characterized their business as "very good" have been dealers for an average of 17 years while those saying business was "terrible" have been selling fertilizer for an average of 34 years. As indicated, there has not been a great deal of turnover in fertilizer dealerships.

The fertilizer business is—	Percent of dealers	Percent of fertilizer volume handled	Number years in the fertilizer business
Hopeless	8	5	34
Poor	45	49	29
Average	33	26	29
Good	8	10	22
Very good	6	10	17

Services performed:

A fertilizer dealer performs many services other than "just a supplier of needed goods and services." As a matter of fact, South Carolina dealers are engaged in a variety of public services ranging from educational programs of public meetings to plot demonstrations and direct technical assistance to individual growers.

77 percent of the dealers recommend the grades and analyses of fertilizer for various crops and pasture

63 percent recommend rates of application of fertilizer for various crops and pasture

43 percent recommend methods of application and placement of fertilizer

32 Percent distribute published information on the subject

20 percent sponsor soils testing programs

14 percent sponsor *test* plots and pasture demonstrations

14 percent made available experienced personnel to assist farmers with their fertilizer problems

5 percent sponsor educational programs over radio, television and at public meetings

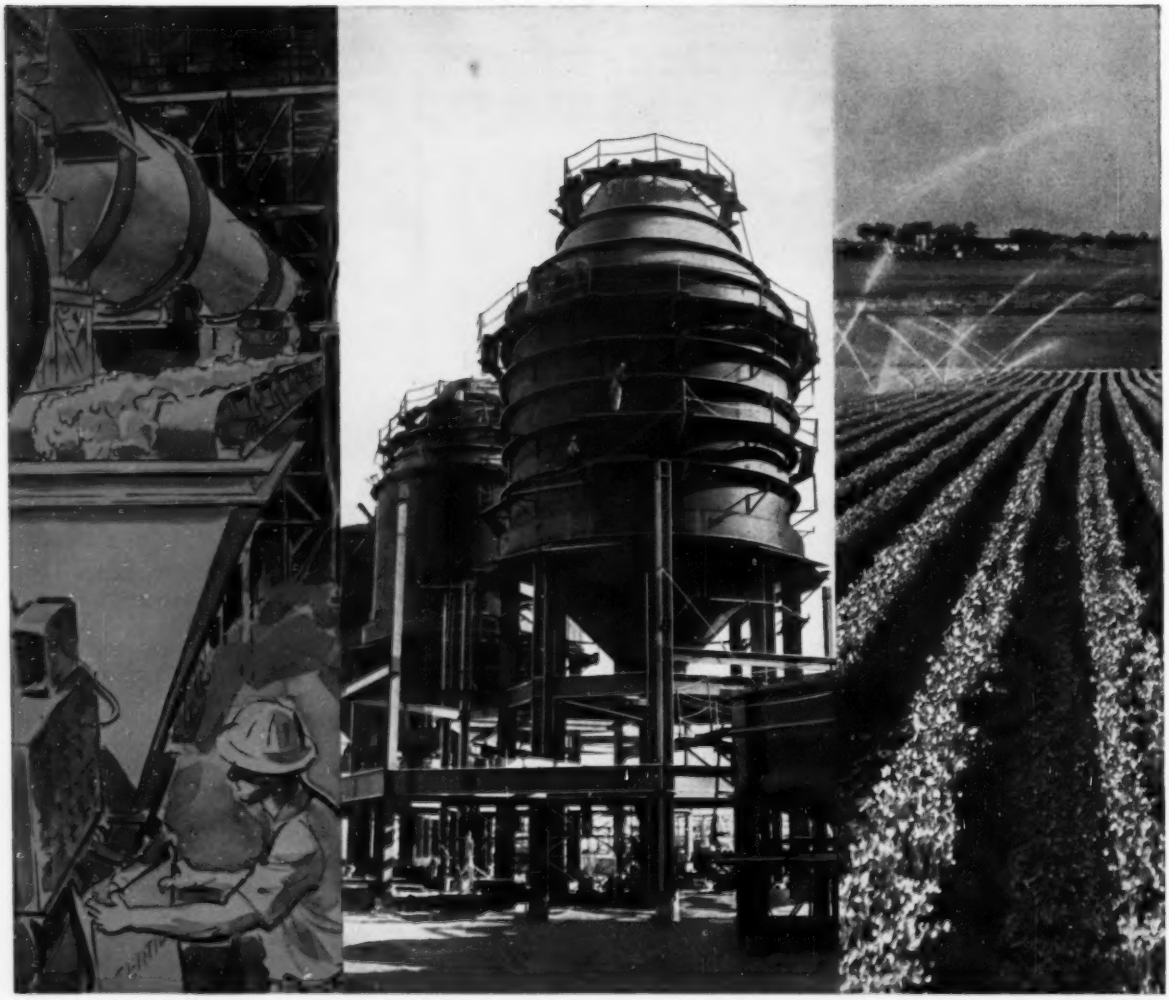
One can readily see that a majority of the fertilizer dealers in South Carolina are doing more than just selling a physical product.

Principal "gripes":

Fertilizer dealers were asked to rank in order of importance their principal "gripes" as regards the fertilizer business. The number one "gripe" for a majority of dealers was price cutting by other dealers.

The second most important "gripe" was that "the company bypasses me and sells direct to my customer." The answer ranking third in importance from the dealers viewpoint was "difficulty in collecting credit sales." This was closely followed by "too little net profit."

The remaining "gripes" in order



3-WAY BOOST IN POTASH

INCREASED PRODUCTION OF TRONA® MURIATE WILL SOON MEAN BETTER SERVICE...BETTER MIXED FERTILIZERS...HIGHER YIELDS OF QUALITY CROPS

Increased production of Muriate of Potash at Trona will be measured in three-way benefits. Expanded potash facilities, shown above, will soon make available from AP&CC more tonnage of free-flowing, uniform granule size Trona potash in granular and regular grades for agriculture's expanding needs. To the mixer, more quality potash from Trona will mean a better finished product . . . and to the grower, higher yields of quality crops.

TRONA® American Potash & Chemical Corporation

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99 Park Ave., New York 16, N.Y.

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of importance were "cost of labor in handling," "excessive overhead and storage costs," and "seasonality of sales." A few dealers indicated that they were confronted with the problem of a decline in volume of sales due to a tremendous decrease in acreage devoted to crops and to pasture-land resulting from the federal governments "soil bank" program.

Sources of fertilizer information:

Dealers were asked from what sources they received the most helpful information for their business. The results indicate that dealers are alert to many sources of information which they pass on to their customers. Among those most frequently mentioned are: *Fertilizer manufacturers* and their various divisions, *Clemson College* including the county agents, the fertilizer inspection service and the various experiment stations, *Farm magazines* and journals, *vocational agricultural teachers*, *Soil Conservation Service* and *farmers themselves*.

Anticipated changes:

The question was asked "Do you plan any changes in your fertilizer operation in the near future?" A summary of the results obtained are as follows:

55 percent planned no changes

45 percent planned changes

About 40 percent of the dealers anticipating some change intend to decrease the amount of credit business they do:

20 percent will seek additional information about fertilizer and its use

12 percent will decrease the size of their fertilizer operations. The annual average tonnage (materials and mixed goods) for this group was approximately 780 tons each

10 percent expect to increase the size of operation. The average quantity of fertilizer (materials and mixed goods) sold by these dealers was 1360 tons per dealer

8 percent were planning to add the use of tank applicators to their services

5 percent indicated that they would increase discounts on volume and cash sales

2 percent plan to erect liquid fertilizer storage facilities

2 percent said they would seek additional credit customers

Annual one day meeting:

The question was asked "Would you like Clemson College to hold a one (1) day meeting or school for dealers, either at one of its experiment stations or a central location in the state?" In response 71 percent of the dealers indicated that they would look with favor on such a meeting. Twenty-one percent did not answer the question, suggesting that they at least would be only lukewarm to the idea. However, 8 percent answered a flat "no."

Summary and Conclusions

There are no final and precise answers in this paper to the complex problems of the fertilizer dealer. However, it is hoped that the data presented will stir some additional thought and probably action on many specific aspects of the problem. In order for farmers to obtain economic optimum use of fertilizer materials the combined efforts of all individuals, institutions and agencies are required. Fertilizer manufacturers, mixers, distributors, dealers and salesmen are directing their efforts in an attempt to satisfy the needs and desires of the farmer.

The fertilizer dealers in this state are qualified salesmen with considerable experience in handling fertilizer. Over half of the dealers who responded to the questionnaire had been in business 30 years or more. Only 4 percent of the dealers had been in business less than 10 years. The average length of service for all dealers was slightly over 25 years.

Individuals owned 46 percent of the fertilizer dealerships included in this study, 25 percent were partnerships, 25 percent were corporations and the remaining 4 percent cooperatives. Partnerships were the oldest dealers on the basis of service averaging 34 years. Cooperatives were the youngest with an average length of service of 10 years.

Fertilizer was the major product line of 25 percent of the dealers who responded to the questionnaire. These dealers accounted for about 40 percent of the total fertilizer sales and their average length of service was 30 years. Farming, general merchandise, cotton, feed and coal were important items in the total business done by fertilizer dealers in this state.

Fertilizer sales volume ranged from $1,000 to $480,000 with an average for all dealers of $46,304. Each dealer sold to over 200 customers during the year and the average quantity of fertilizer purchased by each customer was 6 tons. The gross profit margin (mark-up from purchase price) for cash sales was 7.69 percent and for credit sales 13.63 percent.

Fifty-eight percent of the dealers reported that they realized less than 10 percent gross profit margins on cash sales. However, 55 percent of the dealers indicated that they obtained more than 10 percent mark-up on credit sales. Thirty-five percent of the dealers felt that the mark-up they charged was "inadequate." These dealers handled 44 percent of the total volume of fertilizer.

Fifty percent of the dealers said that their fertilizer division was an integral part of their business organization and 46 percent stated that they had been fertilizer dealers so long that it was hard for them to quit. Other reasons for dealers continuing their fertilizer operations were that it was necessary in order for them to compete with other businesses, it was an important customer service and was a good money-maker in itself.

Over half of the dealers responding to the questionnaire voiced considerable pessimism regarding their future in the fertilizer business. However, the remaining 47 percent characterized their business as average or better and showed no signs of dissatisfaction regarding the fertilizer business.

Fertilizer dealers are searching and striving to keep abreast with the latest and most helpful information regarding their business. Information considered to be of value to their customers is obtained from fertilizer manufacturers, Clemson College, farm magazines and from various state and federal agencies and passed on to the farmer. Twenty percent of the dealers who planned changes in their operations said they will seek additional information about fertilizer and its use.

Farmers To Up Plant Food Use

Four reasons why farmers will continue to boost their fertilizer use were cited by Dr. Samuel R. Aldrich, University of Illinois agronomist, in a recent statement.

1 — Larger crop yields remove more nutrients from the soil.

2—The soil's supply of nitrogen must be higher as the yield potential goes up.

3 — Greater production efficiency through good management practices gives a farmer more net return with which to buy needed fertilizer.

4—The trend toward more crop specialization raises fertilizer demand.

Only Burlap stacks up to every need!

Want *important* savings? Use burlap. You save on space, because burlap bags stack higher. You save on waste...burlap keeps breakage down. You save on handling costs...only burlap can take on 200 pound loads. You save on the bags themselves...burlap is re-usable. And another big plus...the farmer likes burlap. *He* asks for it. You should too.

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WANTED:

far-sighted salesmen to sell new fertilizers a new way in the Midwest

Effective October, 1961, fertilizers will be sold a new way in the Midwest. They will be sold as part of a program. A program tailored to specific soils and crops, that begins with planting and follows right through to plentiful harvest. In short, an ORTHO fertilizer program.

What is this new way of selling?

To put it simply, it is selling *results*, rather than a product. It is selling the increased yields and higher profits fertilizers can bring, rather than fertilizers themselves. ORTHO has sold fertilizers this way in the West for years, with outstanding results. The ORTHO fertilizer program is something farmers have come to rely on. Soon, for the first time, the kind of fertilizers used in an ORTHO program will be available in the Midwest. They will be made in an entirely new way, by an exclusive process, at a huge new 22 million dollar facility being built at Fort Madison, Iowa.

What kind of man is needed to sell them?

First and foremost, he must be interested in doing something for somebody else. Because this man's whole premise in selling ORTHO fertilizer in an ORTHO program is to *help the farmer increase yields, and make money* with the products he sells. Because the company he will work for—the California Chemical Company—is not just interested in sales today. They are interested in the long-term growth of agriculture in the Midwest. Education? A college degree or the equivalent. Experience? At least two or three years of successful selling.

What does this company offer him?

Most important – rewarding work. The ORTHO slogan is "Helping the World Grow Better". Men who work for this company will be doing exactly that. Opportunity for advancement is unlimited. A man can grow within, and *with*, a company which – already a world leader in agricultural pesticides – is heading for new horizons in the exciting field of petrochemicals. Fringe benefits are far above average—the same as those of the parent company, Standard Oil Company of California. Applicants are being hired right now. Send resume of experience, with a letter outlining long range aims and ambitions, to Mr. E. H. Solinsky, California Chemical Co., Ortho Div., 200 Bush St., San Francisco, Calif. Replies will be held in strict confidence.

ORTHO®

HELPING THE WORLD GROW BETTER

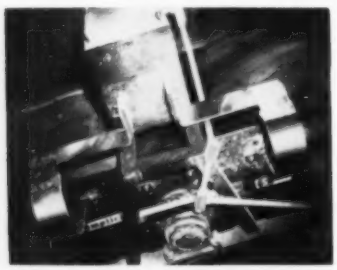
new literature about equipment, materials and supplies

Flexible Bus Bar Heating Vibrating Screens

The most punished part of an electric heating hook-up on vibrating screens is the conductor that carries current from the transformer to the side rail. Sooner or later, all types of cables wear out because they do not have a rhythmic response to vibrator action. This basic weakness has been overcome in Dura-Flex design Flexible Bus Bar introduced by Screen Heating Transformers, Inc.

Dura-Flex bus bar is installed to respond to vibrator motion with spring action. This response keeps the same rate as other springs in the vibrator, so there is no backlash or snap to harden metal microstructure.

Dura-Flex bus bar adds no dead



weight to the screen, has no effect on the finely balanced vibrator assembly. Flexible bus conductors may be installed on any deck without heavy outrigging extending beyond the screen frame. This assures a level and equalized screening surface; material will not 'drift' to one side.

Dura-Flex bus bar provides the large cross section necessary to conduct low voltage current, but minimizes weight. Service records over the past 2 years show the flexible bus bar requires less maintenance and stays on the job longer than other conductors.

For additional information, circle number 1 on CF's Information Service card, page 49.

600-Gallon Fiberglass Tanks

A new 600 gallon molded fiberglass tank has now been marketed to give you a combination of big storage capacity and extremely light weight . . . one-third to one-fourth as much as the weight of comparable steel or aluminum tanks.

In addition, it eliminates all rust and corrosion, reduces maintenance to practically nothing, and assures years of use without replacement. Because it's translucent, you can see the liquid level at all times . . . know at a glance how much solution is remaining.

Low-cost, versatile fiberglass tanks have already proved their worth in field application of all agricultural solutions—mixed liquid fertilizer, nitrogen solutions, phosphoric acid, herbicides, and a chemicals. Now you can use them for nurse tanks, too.

These new fiberglass nurse tanks are the newest addition to a complete line of fiberglass tanks made by Tryco Manufacturing Company. Nine different styles and sizes are now available in capacities from 113 to 600 gallons, for both low-pressure and non-pressure service.

Complete information on these new fiberglass tanks may be secured by circling number 2 on CF's Information Service card, page 49.

Agricultural Implement Chains

Publication of a new 48-page bulletin, no. 61170P, covering its complete line of agricultural implement chain and attachments has been announced by the agricultural chain division of Chain Belt Company.

Bulletin 61170P carries complete dimensions, strengths and weights for steel detachable chain, high fatigue steel detachable chain, drive and conveyor roller chain and agricultural double-pitch roller chain. Each of these groups includes detailed attachment dimensions and drawings and in one section alone—steel detachable chain— there are 64 different styles of attachments listed.

In addition, the bulletin contains specifications on A. S. A. standard and double-pitch roller chains. Also presented are descriptions of Rex poultry feeder chain, flights and slats for steel detachable chain, and drive and conveyor components for agricultural service.

For your free copy of bulletin 61170P, circle number 3 on CF's Information Service card, page 49.

Exhaust Fume Exposure

The amount of carbon monoxide and hydrocarbons to which a driver of a gasoline-powered lift truck was actually exposed in operating such a vehicle indoors, with and without ventilation, is described and illustrated in a report issued by Oxy-Catalyst, Inc.

The findings show that the driver of the test vehicle was exposed to concentrations of carbon monoxide and hydrocarbons despite well ventilated conditions. They show that under all conditions the driver of the lift truck is breathing in quantities of noxious carbon monoxide and cancer-suspect hydrocarbons.

The actual testing of the atmosphere was conducted by the Franklin Institute, using infrared spectrophotometric equipment. Samples were taken from the driver breathing level.

The report, No. 107, 'Exhaust Products from Gasoline-Powered Lift Trucks—Their Effect on the Vehicle Driver', is available free by circling number 4 on CF's Information Service card, page 49.

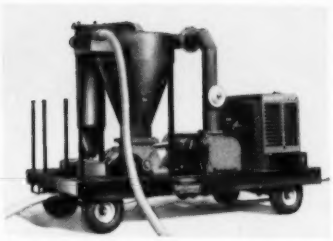
New Face Shield

From General Scientific Equipment Company comes a new face shield that is especially valuable in protecting eyes, face and under chin area. It is particularly adapted to operations where splashing is a problem.

Primary use will be by the chemical and oil industries and wherever full face coverage is required against acids, chemical sprays, foreign particles and other fragments. Worn with a safety helmet, the shield is lightweight and comfortable.

Full, wide, unrestricted vision and audibility is provided by the new shield, named 'The Mark I.' The head gear fits all safety helmets, and is 16" x 9", with .040" thick visor for impact resistance. Other sizes can be made for special applications.

Complete information may be obtained in Bulletin No. 17 by circling number 5 on CF's Information Service card, page 49.



New Portable Transfer Unit

A new portable Airveyor® unit for pneumatic transfer of whole grains, seeds, beans and similar granular materials combines maximum capacity and portability by utilizing a combination vacuum-unloading, pressure-delivery system, according to an announcement by Fuller Co.

Fuller reports the portable transfer unit is the first to offer a positive pressure, constant displacement blower of high efficiencies, permitting the unit to propel a dense stream of material through relatively small ducts. The portable Airveyor is completely pre-assembled at the factory and delivered ready for action at the job site.

Its portability provides versatility of operation in transferring materials through a variety of storage, processing and distribution operations. This includes transfer in either direction between silo and truck or rail car, silo and warehouse, truck and rail car, and ship-to-shore, shore-to-ship.

The new portable transfer unit is available for three standard pipe sizes: 3", 4" and 6" diameter. The 3" and 4" units use a single stage receiver followed by a scavenger tank to trap fines, for easy disposal after each operation. For convenience and because of the larger capacity, the 6" unit has a two-stage receiver. The second stage has a rotary lock to reincorporate its catch with the main conveying stream.

Power for the new transfer unit can be furnished by either internal combustion engine or an electrical motor.

For more information about the new Fuller Portable Transfer Unit, circle number 6 on CF's Information Service card, page 49.

Scale Maintenance Booklet

Causes of scale error and the steps required to eliminate it are outlined in a new eight-page booklet, recently issued by the Howe Scale Company.

The Howe booklet discusses the most common causes of scale error and the serious cost control problems that result from it. It points out the step by step procedure required to eliminate the dangers of scale error. The special equipment and training needed to carry out a satisfactory scale service program and the costs involved are also discussed.

Copies of this information booklet may be obtained free of charge by circling number 7 on CF's Information Service card, page 49.

New Single Wall Container

A new bag-type container called 'Balex', fabricated from the first heavy-duty 'Clupak' extensible kraft paper manufactured on a production basis, has been perfected and made commercially available by West Virginia Pulp and Paper Company's Multiwall Bag Division.

Because of the added strength put into the newly-developed heavy-duty kraft paper, Balex is claimed to outperform any single or double wall baler bag currently available while at the same time reducing costs up to 10%.

The new product has a versatility which makes it flexible enough or easy handling, yet stiff enough to shape up like a box or square and neater pallet loads.

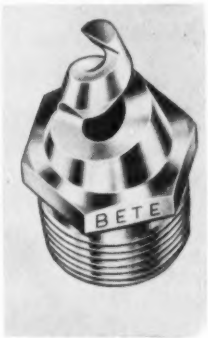
While extending packaging performance and utility significantly, Balex meets all requirements of automated production line filling and closing. It has the conventional construction of a pasted bottom and open mouth and can be closed by either gluing or sewing.

Products presently using balers in volume include sugar, flour, dog food, coffee and produce. Balex not only provides a better container for shipping these products but a host of others including plant food, the manufacturer states.

A technical brochure on Balex can be obtained by circling number 8 on CF's Information Service card, page 49.

Non-Clogging Spiral Nozzles

Eight new models of non-clogging spiral nozzles are now carried in



stock, according to the manufacturer, Bete Fog Nozzle, Inc.

The new nozzles, all of Bete's pinless spiral design, round out the line by providing intermediate capacities not heretofore available.

All are made from one piece of material and given better atomization at lower pressures than conventional nozzles of similar capacity it is claimed.

Called the TF10 and TF14 series, the new nozzles provide capacities of 4 and 8 gpm respectively at 40 psi with wide or narrow angle and full or hollow cone pattern. Each model is available in brass, Type 303 stainless, teflon, pvc, plastic or hard rubber.

A new data sheet covering these nozzles is now available. Order your copy by circling number 9 on CF's Information Service card, page 49.

Mechanical Air Separators

The Raymond Division of Combustion Engineering, Inc. announces availability of a new sixteen-page, two-color bulletin on mechanical air separators.

This bulletin combines the illustrated and completely described features of single and double mechanical air separators with detailed diagrams of the equipment available, pertinent technical data covering the various types of materials to be processed, and listings of tables of sizes and specifications.

Copies of this new Raymond Bul-

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3	6	9	12	15	18	21	24	27	30	33	36

NAME ..... POSITION .....

COMPANY .....

ADDRESS .....

letin 90 can be obtained by circling number 10 on CF's Information Service card, page 49.

Collect Past-Due Accounts

A useful new booklet, 'How To Collect More Past-Due Accounts', has been published by the United States Collection Assn. as an aid to executives faced with the problems of collecting ever-increasing past-due accounts.

This work was written by credit experts whose experience in collection work has given them the background to produce this pamphlet. In it is described the dignified and friend-saving principles of modern credit collection science. The authors suggest numerous powerful cash-getting techniques . . . to help you get the cash in fast from 'past-due' customers. They suggest firm but dignified appeals so that you will not only collect your accounts but, most important, you will retain your customers' good will and thus accelerate future growth of your business.

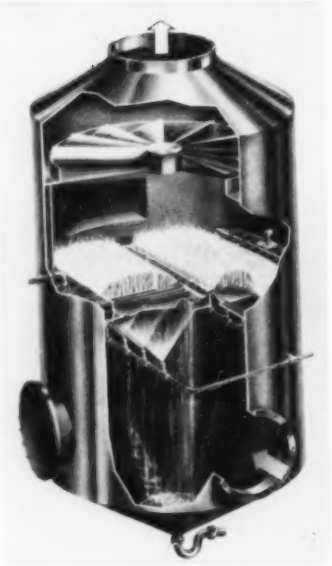
To obtain a free copy of this booklet, circle number 11 on CF's Information Service card, page 49.

Dipole Measuring

An instrument, recently been placed on the market by Kahl Scientific Instrument Corporation, is claimed to be unique, and the only equipment specifically designed for dipole moment measurements. As well as being an accurate technical tool it has also found application for quality control and research analyses.

The Dipolemeter DM 01 is a precision measuring instrument designed for the evaluation of the molecular electrical dipole moment of liquids by accurate measurement of the dielectric constant. It further permits exact determinations of the dielectric constant of liquids, pastes, and solids for non-destructive quality control, purity test, dielectric analyses, chemical investigations, etc., because of its extremely sensitive measuring range ($2 \bullet 10^{-5}$ for liquids). Interchangeable calls and micrometer electrodes are available for the various media and substances to be analyzed.

Further information and catalogs are available by circling number 12 on CF's Information Service card, page 49.



Impingement-Plate Scrubber

W. W. Sly Manufacturing Co. has announced its new line of impingement-plate-type scrubbers for wet cleaning, absorption or cooling of gases resulting from a wide range of industrial processes.

The Sly 'Impinjet'® Gas Scrubber is said to provide a high efficiency scrubbing action with low operating and maintenance costs. Both single and multiple impingement plate units are available.

Scrubbing is accomplished by the turbulent interaction of gas and liquid, as effected by the stainless steel impingement baffle plate.

The single-stage scrubber handles dust loadings at inlet of up to 100 grains per cubic foot. It can remove suspended materials in a gas stream that range from sub-micron fumes to dust particles in the larger micron sizes, with efficiency in excess of 99% on many types of dust.

Because of the simple design, pressure drop and resulting power requirements are low. Liquid consumption is only 1 to 3 gallons per 1000 CFM at 20-40 psig.

Because there are no moving parts in the scrubber, maintenance costs are low. Less space is required for installation than other types, and the units can be furnished with round shells or rectangular casings to fit the particular installation space.

Complete information is available by circling number 13 on CF's Information Service card, page 49.

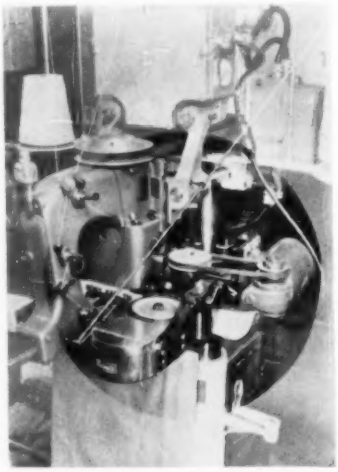
Bag Top Printer and Coder

Development of an automatic bag printer that assures clear, uniform printing of product specifications or codes above the sewing line of sewn multiwall paper bags has been announced by the Bemis Bro. Bag Company.

The new Bemis Bap Top Printer is mounted on a sewing pedestal and imprints the bag as it is being sewn closed. The new unit utilizes a Porelon® ink roll which eliminates the use of fluid inks, solvents, reservoirs, transfer rolls, etc.

Simple to set up and easy to maintain, the Bemis Bag Top Printer is power-driven to assure clear printing. Type, on the rotary print wheel, can be quickly changed. If, on certain products, printing is not desired, the complete printer pivots on the pedestal column to swing clear of the packing line.

Printing speed is set by a variable speed sheave on the motor which is



synchronized with the speed of the conveyor and sewing head. This positive control, together with a shelf-indexing type print wheel, assures printing in the same location on each bag.

In operation, the attendant simply leads the edge of the bag into the printing guide. From this point, the bag is coded and an actuator starts the sewing head to sew the bag. The thread is automatically cut when the bag leaves the sewing head.

The Bemis Bag Top Printer is designed to give maximum efficiency of operation when used in conjunction with a Bemis sewing pedestal; however, it is possible to adapt the printer to certain other type pedestals.

The Porelon ink rolls are available in black, red, green and violet colors for quick identification in storage or shipping.

Engineering specifications and operational data are available by circling number 14 on CF's Information Service card, page 49.

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Information Service Bureau

Commercial Fertilizer and Plant Food Industry

75 Third Street, N. W.

Atlanta 8, Georgia

New Spectrophotometers

A new "A" series of double-beam, ratio-recording DK Spectrophotometers —incorporating improvements resulting from more than six years of continuous refinement— is being marketed by the Scientific and Process Instruments Division of Beckman Instruments, Inc.

The new series—the DK-1A and DK-2A, and the Far UV DK-A in each of the two models—is described in a new brochure which includes information about both the standard instruments and the Far UV DK's.

The DK Spectrophotometers are widely used in quality control studies, molecular structure analyses, and numerous other research applications.

The DK-1A features continuous linear strip-chart recording, a separate recorder unit, and a bench-type monochromator with a built-in time drive for reaction rate studies.

The DK-2A is a compact, bench-size instrument with the convenience of a built-in flat-bed recorder.

For a copy of Bulletin 735-B, circle number 15 on CF's Information Service card, page 49.

Motion Safety Switch

An improved type motion safety switch for protecting machines, equipment and processes against damage resulting from stoppage or reduced speed is described and illustrated in a new two-color, 4-page bulletin now offered by Fuller Co.

Design, installation and operation of the improved switch are described, as well as typical applications. Two installation photographs and a cutaway drawing of the switch are included.

For copies of Bulletin MS-3 on Fuller's Improved Type Motion Safety Switch, circle number 16 on CF's Information Service card, page 49.

Chemical Standards

Chemical Service Laboratories has announced the introduction of their 'Standardettes,' chemical standards which permit laboratory technicians to accurately standardize titrating solutions to four-figure accuracy in a matter of minutes.

A 6-page illustrated folder has just been released, giving detailed descriptions, prices, packaging, and applications of Standardettes in graduate research, water analysis, sewage treatment, electroplating control, and in the chemical and food processing industries.

The new folder is available to graduate students, laboratory technicians, purchasing agents and management in all fields where chemical process control is required. For a free copy, circle number 17 on CF's Information Service card, page 49.

Anti-Caking Conditioner

A new anti-caking product that conditions mixed fertilizers and other materials against hardening in storage has been announced by Zonolite Company. Called 'Conditioner BO5', the flake-form product resists the intergrowth of crystals that causes caking.

Conditioner BO5 is incombustible and sterile, thus eliminates the transportation of plant diseases and micro-organisms from one part of the country to the other, a problem which arises when agricultural wastes are used as conditioners. Used in amounts of 1 to 10 percent by weight, the new low-cost product is shipped in either bulk or bags. Sales are handled by Zonolite's Agricultural Sales Group.

For further information, circle number 18 on CF's Information Service card, page 49.

Bucket Elevator Manual

A new 84-page manual, announced by Webster Manufacturing, Inc., is designed to simplify the selection and application of bucket elevator systems for bulk handling of chemicals and fertilizers in powdered, crushed or lump form.

The booklet illustrates a wide selection of basic bucket-elevator types . . . centrifugal discharge, perfect discharge, continuous bucket, gravity discharge elevator-conveyors and pivoted-bucket carriers.

A spread on the basic fundamentals to be considered in selecting the right bucket elevator for a given handling problem lists 8 factors which must be taken into account: Type or kind of material to be handled; its weight per cubic foot or bushel; handling rate—tons, cubic feet or bushels to be handled per hour; maximum lump size; height material is to be elevated; duty per day; chemical reaction of material; protection required from weather, heat, dust, etc. Practical examples are given to explain the use of this information in selecting specific bucket elevator types.

A table lists 101 different bulk materials regularly handled in various industries and 318 possible bucket elevator types from which you can select the right types for specific situations.

Webster, one of the nation's oldest manufacturers of bucket elevators, will engineer and install a complete system or supply a wide range of components, which are listed in the manual.

To request Catalog be-55, circle number 19 on CF's Information Service card, page 49.

Liquid Fertilizer Spreader

An economical liquid fertilizer spreader that features efficient construction and operation has been announced by Baughman Manufacturing Company.

The new spreader, designated the Rapid Spread, operates on compressed air. Discharge is in the form of solid droplets, rather than the conventional mist spray. These heavier 'raindrop' particles can be spread more precisely, and unlike the mist spray, don't drift away in the wind.

The Rapid Spread is designed for mounting on a regular flat bed truck or wagon. Attached hooks allow it to be lifted into place and removed with ease—the entire operation can be done in about ten minutes. Baffles attached to the sides of tank hold it steady and prevent side and end sway. Standard units weigh approximately 1380 lbs. and hold 1000 gallons of liquid. Other body sizes can be built to order.

All moving parts on the Rapid Spray are positioned outside the tank to avoid corrosive action of acid-base fertilizers. Pressure is controlled by a two-way switch which can be mounted in truck cab or on tractor; spreading width is pressure-actuated and covers an area 40 to 60 feet wide. Since the process of compressing air automatically heats it, and because air pressure agitates the liquid contents, fertilizer is prevented from sludging or 'salting out' in cold weather.

Further information about the new Rapid Spread Liquid Fertilizer Spreader can be obtained by circling number 20 on CF's Information Service card, page 49.

Corn Soil Insect Control

An educational, four-color brochure produced by Velsicol Chemical Corporation, basic producer of Heptachlor insecticide, provides convincing proof that soil insect control is profitable.

This informative, sixteen-page booklet refers to various experiment station tests covering soil insect control. The booklet discusses a summary of 23 university comparison tests that show soil insect control increased yields by an average of 10.75 bushels per acre.

The brochure describes how soil insects invade fields and cause damage. Particular discussion is given to white grubs, corn rootworms, wireworms, and cutworms.

Included in the attractive piece are 16 full color illustrations covering the common soil insects that damage corn and information on how to control soil insects, including application methods.

Free copies of the booklet, designated as No. 503-30, may be obtained by circling number 21 on CF's Information Service card, page 49.

Association Activities

SOUTHERN CONTROL OFFICIALS MEET JUNE 5-7, LEXINGTON, KY.

The Southern Association of Feed, Fertilizer and Pesticide Control Officials will meet at the Lafayette Hotel, Lexington, Ky., on June 5, 6, and 7, 1961. Bruce Poundstone, who served as Secretary- Treasurer for 10 years, is the current president.

Registration will begin Sunday afternoon, June 4. There will be a meeting for control officials only, Sunday night and Monday morning. Registration will continue Monday morning.

Monday afternoon there will be a tour for everyone attending, including families. This will cover local industrial plants, some of the horse farms and historical sites in and around Lexington. The tour will terminate at Spindletop House where a buffet supper will be served. After supper, Mr. Penrose Ecton, a well-known speaker from Lexington, will address the group.

Spindletop is an estate recently purchased by the Kentucky Research Foundation.

The general session will begin Tuesday morning with the president's address followed by a panel discussion. Members of the panel will be: Paul T. Truitt, NPFI, W. E. Glennon, AFMA, J. A. Noone, NACA, and F. Dallas Sparre, MCA.

The panel will consider questions concerning the work of their respective association especially as it relates to the work of control officials. The afternoon session will be devoted to talks on animal nutrition and fertilizer manufacturing.

A special program has been arranged for the ladies on Tuesday. This will be highlighted with a luncheon at Carnahan House, the former mansion on Goldstream Farm and now used as a club for alumni and faculty.

A barbecue dinner, followed by a folk music program is scheduled at Keeneland race track Tuesday night for everyone, including families of those in attendance.

The general session will continue Wednesday morning with talks on pesticide residues, what the various states and the Federal government are doing regarding pesticides and a discussion of the Hazardous Articles Law. The customary business session for the election of officers and other association business will conclude the meeting which will adjourn at noon.

Members of the feed, fertilizer and pesticide industry, manufacturers and dealers, who do business in Kentucky are especially invited to attend this meeting.

Commencement exercises at the University will be held on June 5. Persons who plan to attend the Control Official's Meeting should make hotel reservations as soon as possible so as to be assured of housing.

1962 Purdue Short Course

A short course on fertilizer technology will be held at Purdue University, Feb. 12 and 13, 1962, under the sponsorship of the Soil Science Society of America, it was announced by Dr. Werner L. Nelson, president of the Society.

Chairman of the committee arranging for the short course is Dr. Malcolm H. McVickar, Ortho Division, California Chemical Co. Other committee members include: Dr. R. A. Krantz, University of California; Dr. R. D. Munson, American Potash Institute; Dr. L. B. Nelson, TVA; Dr. R. W. Starostka, Davison Chemical Division, W. R. Grace & Co. and H. H. Tucker, Sohio Chemical Co.

The purpose of the short course is to bring together recent information on fertilizer technology and resources in the U. S. for use by college and industry men.

Program details are being developed and will be announced as soon as they are available. It has been suggested that industry men might perform a real service by making it possible for college scientists to attend, so they might be better informed on the progress of the industry in the field of fertilizer technology.

The short course will immediately precede the annual joint meeting of Midwestern Agronomists and Fertilizer Industry Representatives at the Edgewater Beach Hotel, Chicago, Feb. 15 and 16, 1962, sponsored by the National Plant Food Institute.

Pacific N.W. Conference Scheduled for June 27-29

The 12th annual Pacific Northwest Regional Fertilizer Conference is scheduled to be held June 27-29 at the Marion Motor Hotel, Salem, Oregon. The theme is "The effect of fertilizer on crop quality and composition." Reservations should be made direct with the Marion Motor Hotel.

Institute Seeks More Farm Product Uses

Through the forest of ideas on how to boost farm income, the paths toward methods for increasing industrial use of fibers from the fields seem to be the most tangled.

A new agency to help clear some of these paths now is being created. It is the Institute of Agricultural Utilization Research at Purdue University.

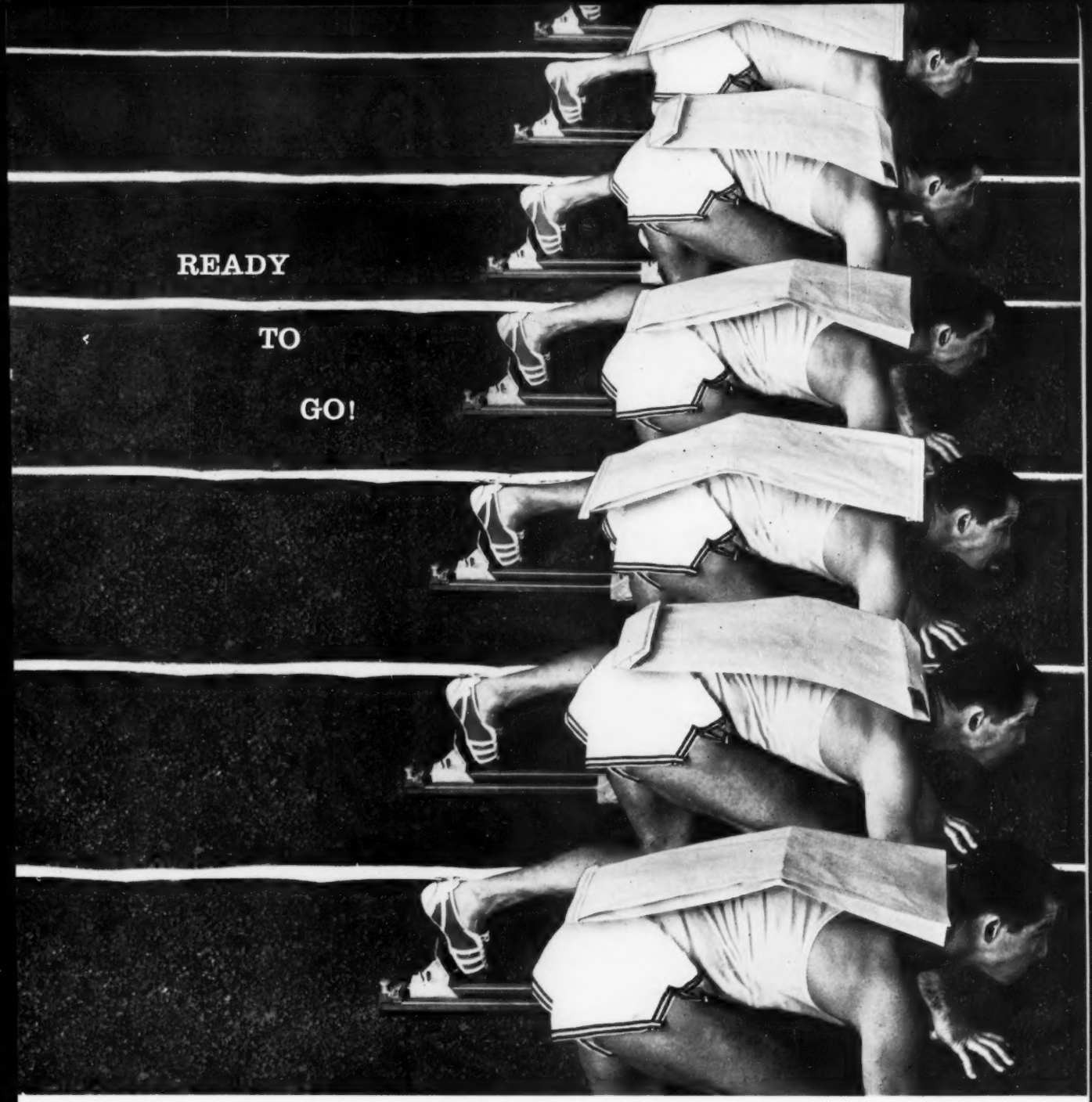
Its purpose is to stimulate, coordinate and strengthen Purdue's scientific work—leading to the development of new and broader uses for farm products.

A committee of research scientists will guide the program. Dr. Roy L. Whistler, Purdue biochemist, is committee chairman.

Soil, Crop Research Journals To Use Elemental Method

The elemental method of expressing fertilizer nutrients, including minor elements, will be used in the research and educational journals of the Soil Science Society of America and American Society of Agronomy, beginning with the January 1962 issues.

This action was taken by the SSSA and ASA executive committees at their 1960 meetings last December. Authors will be permitted, however, to include the oxide expressions such as P_2O_5 or K_2O along with the elemental analyses.



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Whichever St. Regis® bag you want, whenever and wherever you want it, you'll get it... fast! St. Regis has 13 bag plants strategically located in the major fertilizer shipping areas to meet your national or local needs. Each can supply you with the complete line of bags and is fully equipped to give you swift, dependable service during peak-season rushes.

Fast delivery is only one part of St. Regis *Packaging-in-Depth*. This complete bag service assures you of the *right* bag, the *right* machinery to pack it, plus the services of a highly-skilled engineering staff. To meet your *future* needs, this program also includes continued research to develop improved packaging methods and economies.

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CHANGES

Atlas Announces Four Sales Offices

Joseph A. Snook, president of The Atlas Mineral Products Company, Inc., Mertztown, Pa., has announced the opening of two new sales offices and the appointment of two new representatives:

Thomas B. Cardene will become technical sales representative at 521 East Main Street, Richmond, Virginia. Mr. Cardene was formerly in the Cincinnati sales territory and in his new position he will serve the states of Virginia, North Carolina and eastern Tennessee and the District of Columbia.

Dallas W. Cann becomes technical sales representative at Room 208, 312 East Wisconsin Avenue, Milwaukee, Wisconsin. He will cover the state of Wisconsin.

Landes, Zachary and Peterson Company with offices at 2501 South State, Salt Lake City 15, Utah were appointed industrial sales representatives for the Mountain territory consisting of Utah, southern Idaho, eastern Nevada and western Wyoming.

The George F. Heath Company, Inc. with offices at 430 Chouteau Avenue, St. Louis 10, Mo. and a branch office in Kansas City was appointed industrial sales representative of the Midwestern territory which include Missouri, Kansas, Nebraska, southern Iowa and southern Illinois.

PROFITS GROW BEST
WITH LIQUID FERTILIZER

Liquid fertilizers are booming. In the past two years alone, manufacturing plants have doubled and retailers report sales as high as 100 tons of liquid to every ton of dry!
When you sell liquid fertilizers you offer the farmers in your area greater speed, uniformity, and accuracy of application, lower cost of application per acre, and increased flexibility of application.
Nine chances out of ten your customer will look to you for custom application, too . . . adding further profits on almost every sale.
Get your share of this growing business by offering your customers a complete one-stop fertilizer source. We can furnish you with all the equipment you need, help you establish sources of supply, work with you to get your liquid fertilizer business started.
No matter what size operation you plan, Tryco can serve you with a more complete line of equipment and supplies than any other company. You'll find Tryco the ideal one-stop source for every need . . . from storage tanks or nurse tanks to transfer pumps, fibreglass tanks, hose, and nozzles.
Let us show you, too, how economical Tryco applicators and complete line of liquid fertilizer equipment can help you make the most of the profit opportunities right in your own area. A letter or a phone call will bring you complete information . . . without obligation, of course.

Tryco

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1160 SOUTH MONROE STREET • DECATUR, ILLINOIS
P.O. BOX 1277 • PHONE 428-4666

Inglett Forms New Company

Cecil M. Inglett, former executive vice president and secretary-treasurer of Inglett, & Company, Inc., Augusta, Georgia, has formed a company at Augusta known as "Inglett Development & Engineering Associates, Inc. (Idea, Inc.). The new company will serve the fertilizer industry with complete systems and machinery for manufacturing, packaging and shipping fertilizer. In effect, they will specialize in materials handling from raw materials to the finished product.

Inglett

A function of this organization will be the development of any machinery which may contribute to the efficiency and economy of fertilizer manufacture. Mr. Inglett has been successful in development and engineering for several years and plans to continue in this field on an even broader scale than before.

The new company has been fortunate in acquiring the engineering skills of Jos. B. Thomas whose abilities are well known to the ceramics and cement industries. His training, experience and native abilities qualify him in his present capacity, and it is expected that his association with the company will contribute much to its success.

Minden to be Liquidated

The Minden Cotton Oil Mill and Ice Co., Ltd., Minden, Louisiana, will be liquidated as a result of action taken by the stockholders, who unanimously approved this move.

(Continued on page 56)

Pick top quality Phillips *66* fertilizer materials to produce *more profits*...

PHILLIPS PETROLEUM COMPANY • Bartlesville, Oklahoma • SalesOffices: Amarillo, Tex., First Nat'l Bank Bldg. • Atlanta, Ga., 1428 West Peachtree St. • Bartlesville, Okla., Adams Bldg. • Chicago, Ill., 7 South Dearborn St. • Columbus, Ohio, 395 E. Broad St. • Denver, Colo., 1375 Kearney St. • Des Moines, Iowa, 6th Floor, Hubbell Bldg. • Houston, Tex., 6910 Fannin St. • Indianapolis, Ind., 3839 Meadows Drive • Kansas City, Mo., 201 E. Armour Blvd. • Maplewood, N.J., 2075 Millburn Ave. • Minneapolis, Minn., 215 South 11th St. • Omaha, Neb., 3212 Dodge Street • Pasadena, Calif., 317 North Lake Ave. • Raleigh, N.C., 401 Oberlin Road • Salt Lake City, Utah, 68 South Main • Spokane, Wash., 521 East Sprague • St. Louis, Mo., 4251 Lindell Blvd. • Tampa, Fla., 3737 Neptune St. • Tulsa, Okla., 1708 Utica Square • Wichita, Kan., 501 KFH Building

Pacific Guano To Operate Independently

Pacific Guano Company, formerly controlled by Pacific Chemical & Fertilizer Co., will be operated as an independent agricultural chemical marketing organization, according to the company's new owner, Collier Carbon and Chemical Corporation.

Pacific Guano Company markets a complete line of fertilizers, insecticides, and herbicides under the familiar "Gaviota" and "Gavicide" brand names throughout California, Arizona, and Nevada.

William H. Foster, long associated with the chemical fertilizer industry, has been named President. H. G. Conley, J. G. Hollingshead, P. V. Weingart, and F. W. Doyle continue as officers.

Pacific Guano Company also owns a 60% interest in Western States Chemical Corporation, manufacturer of ammonium phosphate fertilizers marketed under the "Gro" brand.

Because the fruit and vegetable crops were treated with

TRIANGLE BRAND COPPER SULFATE

Regular or basic copper sulfate should be mixed in insecticide-fungicide sprays and dusts to insure appetizing, attractive fruits and vegetables that consumers "reach for."

When used in fertilizers, Triangle Brand Copper Sulfate helps to enrich the soil, resulting in healthy, profitable crops.

Help your customers produce more profitable crops. Use regular or basic Triangle Brand Copper Sulfate in your fertilizer and insecticide-fungicide formulations... it will mean more money in your pocket!

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Meissner Open Memphis Regional Office

Meissner Engineers, Inc., has announced the opening of a regional office in Memphis, Tennessee, to provide engineering and construction management services to clients throughout the Mid-South.

Robert C. Meissner, company president, said the firm has been active on chemical processing and construction projects in the area for some time, but that its decision to open a Memphis regional office was based upon the projected growth of the chemical industry in the Mid-South.

The office, 2158 Union Avenue, Suite 415, Memphis, will initially include chemical and material process engineering personnel to assist client organizations in their expansion and technical programs, he said.

The Chicago-based company, with offices in 12 cities, provides engineering and construction services to clients in widely diverse fields throughout the Western Hemisphere, Europe, Africa and the Middle East.

Ursuline Professor Gets $4,500 Grant

Dr. Thomas E. Kargl, assistant professor of chemistry at Ursuline College, has received a $4,500 grant from the Petroleum Research Fund to be used for research in determining the structure of complex polyenes. These are chemical compounds found in every type of living green tissue.

Hollingshurst Moves To Stamford, Conn.

Hollingshurst & Co., Inc., have moved their offices from New York City to 322 Main Street, Stamford, Connecticut. Their new phone is Davis 4-7311.

Fertilizer Industry

Round Table Proceedings

Complete proceedings of the Fertilizer Industry Round Table technical conference, held last November, are now available.

Price: $4 per copy. Order from:

Dr. H. L. Marshall, Sec.-Treas.
1604 Walterswood Rd.
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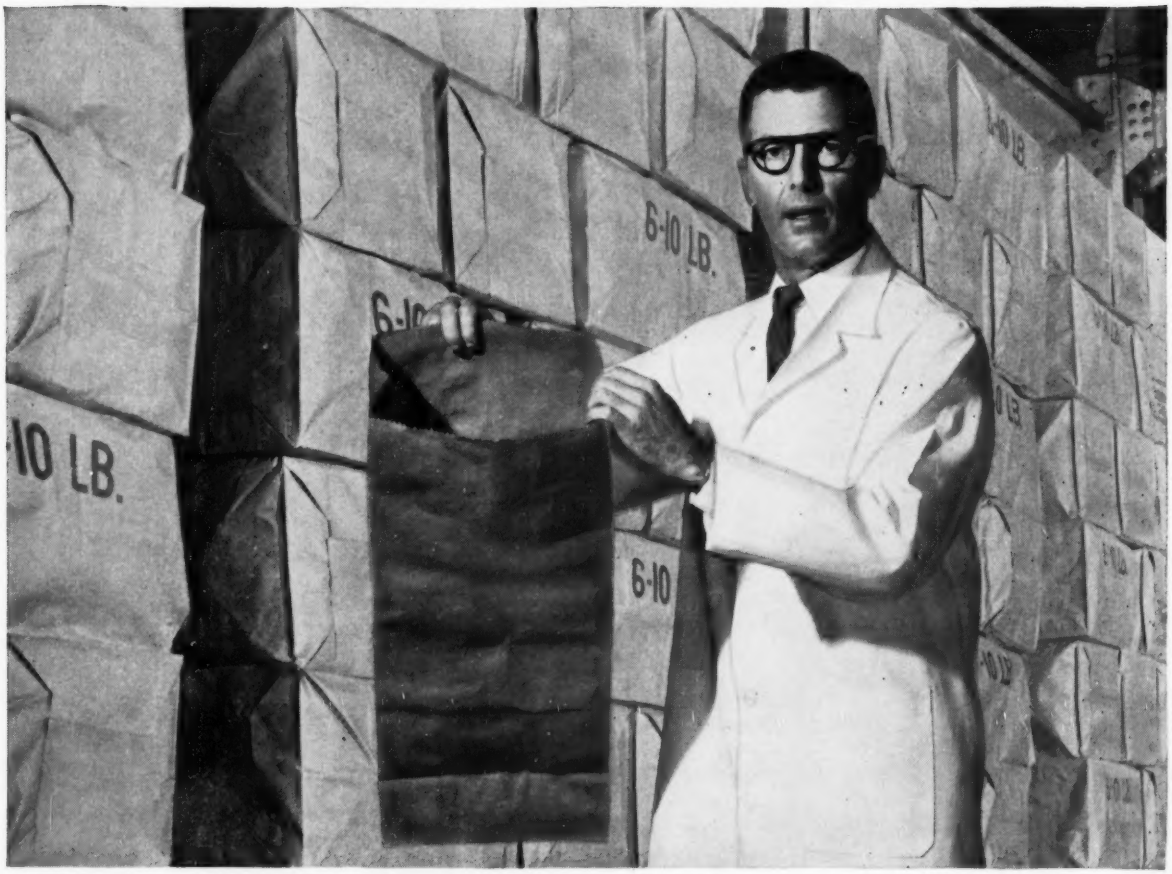

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The New, Tougher, Lower Priced Baler

BALEX is a new and superior single ply shipping container made from a new, extra heavy kraft Clupak* extensible paper. It will outperform any single or double wall baler bag currently available, *yet cuts costs up to 10%*. If you ship almost any dry product—in pockets or in bulk—it will pay you to get the whole story on BALEX.

BALEX is the newest in a growing number of developments by West Virginia to provide better bags at lower cost. Some of the other recent technical advances are:

Impactape™ **closure**—drastically reduces sewn-end bag failure by adding four layers of tape to the sewn end.

Kraftsman™ **Clupak extensible paper**—pioneered the unique "stretchable" kraft that cuts bag breakage.

WONDERWALL™ **bags**—developed the technical knowledge needed to convert Clupak extensible paper into better and less expensive bags where lighter or fewer plies do more work.

West Virginia Pulp and Paper

Whatever your bag problem, we invite you to put it up to us. Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, New York.

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.*

Multiwall Bag Division, Dept. T451
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Gentlemen: Please send me more information on:

☐ Balex ☐ Kraftsman CLUPAK extensible paper
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CALIFORNIA'S NINTH FERTILIZER CONFERENCE

250 persons attended the Ninth Annual California Fertilizer Conference, held on the Kellogg-Voorhis campus of California State Polytechnic College, Pomona, March 27-28.

Sponsored by the California Fertilizer Association's Soil Improvement Committee, this annual Conference provides the forum at which information developed during the preceding year by University, State College, and industry scientists in soil fertility and plant nutrition is made available to the interested public.

George Park, Vice President, Rocca-Cuvi, Inc., San Francisco,—Conference Chairman, said there was unusual interest in the excellent reports given by University and other scientists and that general discussion during the two panels pointed up the importance to agriculture and the fertilizer industry of their subjects.

Featured Conference subjects were use of nitrogen and of micronutrients in the production of major California crops.

The uncertain farm labor picture for 1961 was explored by two experts on the subject following the banquet at Holiday Inn, Montclair. Jack T. Pickett, publisher of CALIFORNIA FARMER, San Francisco, reviewed the development of the problem, and John V. Newman, Ventura, President of the Council of California Growers, outlined possible solutions. Pickett pointed out that California was chosen for the initial efforts to organize farm workers because it was felt that its high cost, high value, specialty crops, together with the seasonal requirement for a large labor pool, would make it more vulnerable to organization than would be the case elsewhere. He said that to date the only result has been to disrupt the Mexican National program—no appreciable numbers of farm workers have joined the union, and only one farmer in Tehama County has signed a union agreement.

Newman pointed out that the union effort has created some farmer uncertainty concerning an adequate harvest labor force this fall, especially among those who have relied heavily on foreign nationals. He said that farmers have paid too little attention to public relations and that the public image toward them is not as good as it should be. He said that many groups in addition to our national government insists that the farmer accept sole responsibility for that national problem, the migrant workers. He pointed out that they are largely uneducated and untrained, and are completely rejected by industry, making the farm the sole remaining place for possible employment.

He said that the best solution to the problem is for the farm employers to do a much better job in training their workers, and that their field and crew foreman must be capable of working with people and understanding their problems. This would up-grade their on-the-farm earning capacity under the piece-work pay system which has long prevailed. Farmers must do a better job of making their problems known to legislators and to government officials. Insurance programs are now being made available to farm workers and this should be expanded, he said. Mechanization is being forced on agriculture because of growing uncertainty as to reliable labor availability.

The current reorganization of the California Department of Agriculture and its impact on the fertilizer industry was described by DeWitt Bishop, Sacramento, Program Supervisor, Inspection Service for Field Crops, Fertilizers and Agricultural Chemicals.

University and industry scientists presented papers describing new information developed concerning fertilizer use during the previous year. Dr. Roger Humbert, San Jose, Western Director, American Potash Institute, reported that sugar is one crop not in surplus production—on the contrary, substantial quantities are imported. The Cuban situation is forcing changes in our sugar program which should result in an increase in domestic production. Beet sugar's share of U. S. production is expected to increase from 46% to 60 plus % in the next 10 years. California and the west will figure in this expanded production, and, since this crop is a heavy user of nitrogen, phosphate and potash, the fertilizer industry will benefit proportionately, he said.

Drs. B. R. Krantz, James Cook, and Perry Stout, all of the University of California, Davis, presented featured papers on micronutrient deficiencies which reported on progress in their correction. These were highly interesting and somewhat technical in nature and will be reported in full in the Conference proceedings to be published by the Association. Copies can be ordered at $1.00 each, prepaid, through the Association office at 719 K Street, Sacramento.

Haven Leavitt, Shell Development Company, Modesto, projected nitrogen's future in California agriculture. He reported a steady and rapid increase in its use here between 1940, when 31,820 tons were applied, and 1959 which saw a use here of 260,270 tons of nitrogen. Before 1925, the principle nitrogen materials available were a small amount of ammonium sulfate, tankage, blood meal, fish meal, guano, calcium nitrate, and sodium nitrate. Ammonium sulfate became well established by 1930, and in 1934, anhydrous ammonia appeared on the scene as a fertilizing material. The 1940's saw a rapid expansion with increased use of established materials, and the appearance of urea, 16-20-0, 11-48-0, ammonium nitrate, ammoniated superphosphate, and aqua ammonia. In 1956, diammonium phosphate (21-53-0) was developed. New products now entering the field include magnesium ammonium phosphate and ammonium chloride. Development of improved placement of fertilizers is enhancing the efficiency of nitrogen utilization. He predicted an ever-increasing tonnage of nitrogen in California.

The panel discussions on micronutrients and on nitrogen were exceptionally well accepted, and they, too, will be reported fully in the proceedings. Mordy S. Rose, Vice President, J. F. Sloan Company, Salinas, was moderator of the micro-

(Continued on page 64)

More protein—more meat. High-protein grains pay big dividends in faster-growing, fatter cattle and sheep.

Pass this word on to your fertilizer customers...

NITROGEN FERTILIZATION CAN MEAN 30% HIGHER PROTEIN GRAIN...FASTER-GROWING, FATTER CATTLE AND SHEEP

Nitrogen fertilization can increase grain protein content by more than 30% . . . per-acre grain yield by more than 100%. High total crude protein in grains means more beef, lamb and mutton—*on less purchased protein feed supplements.* Our "Tech-Tips" Bulletin #4 gives full details . . . and Texaco offers 16 Nitrogen solutions for fertilizer manufacture.

Solutions range from 37% to 53% nitrogen content. Sixteen different Nitrogen Solutions—ranging from 37% to 53% nitrogen content—are available at our Lockport, Illinois, plant. Six solutions also contain urea. Delivery is always fast and on-time because of ample loading, switching and transportation facilities.

Technical advisory service available. Write—if you have a technical problem involving fertilizer manufacture. Our Research may have the information you need.

Our manual, "Texaco Ammonia and Nitrogen Solutions For Farm and Industry," also contains much useful information for the fertilizer manufacturer. For your free copy, plus regular copies of "Tech-Tips" as they appear, write:

Texaco Inc., *Petrochemical Sales Division,* 135 East 42nd Street, New York 17, N. Y., or 332 South Michigan Avenue, Chicago 4, Ill., Dept. CF-30.

Tune In: Texaco Huntley-Brinkley Report, Mon. Through Fri.-NBC-TV

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AQUA AMMONIA, ANHYDROUS AMMONIA, NITROGEN SOLUTIONS, DIISOBUTYLENE, ODORLESS MINERAL SPIRITS, NAPHTHENIC ACID, PROPYLENE TETRAMER AND RUST INHIBITORS, CUMENE, BENZENE, TOLUENE

IMC in Canada

BUTTONING UP THE BLAIRMORE

At top, below: More than 1,400 feet underground, Saskatchewan's Premier T. C. Douglas (right) and Thomas M. Ware, president of International Minerals & Chemical Corporation (Canada) Ltd., install the final bolt in an engineering feat that paves the way for opening Canada's vast potash reserves to world markets. The gold bolt is the last of some 17,000 used to assemble a 3,000-ton cast-iron shaft lining that walls off a 200-foot layer of quicksand, called Blairmore. This layer of Blairmore has blocked all previous attempts to develop Saskatchwan's potash reserves—called the world's largest deposit of high-grade potash ore. The IMC plant and mine is expected to be in production within the next 15 months.

Center, below: One of three immense potash storage buildings at the Esterhazy mine and plant. Each building can hold 35,000 tons of finished product. The buildings are 200 feet in diameter and are the first laminated wood buildings to be designated as pure conical structures.

Bottom: The pilot processing plant is virtually complete at the Esterhazy potash mine. The cone-shaped structures are the huge storage buildings; tall structure in center cluster of buildings is headframe over the mine shaft.

An engineering feat that paves the way for opening Canada's vast potash reserves to world markets has been completed by International Minerals & Chemical Corporation (Canada) Ltd.

The final bolt placed in the cast-iron lining for 350 feet of a potash mine shaft 12 miles northeast of this Saskatchewan prairie town, marked the conquest of a problem which has stymied Canadian potash development for years.

This symbolic bolt was the last of some 17,000 used in putting together a 3,000-ton cast-iron lining which protects the shaft against the 200-foot Blairmore stratum, occurring at Esterhazy between the 1240- and 1439-foot levels. The Blairmore, a capricious geological stratum which carries oil in some areas, coal in others, and water under extremely high pressure in others, is composed of water-bearing sand and clay layers where it occurs in this area.

To sink its shaft through this stratum, IMC's Canadian subsidiary used a freezing and "tubbing" technique new to this hemisphere but employed to solve similar shaft-sinking problems in Europe.

A foremost specialist in this work, Associated Mining Construction, Ltd., was brought in to sink through the stratum and install the lining, which is called tubbing. AMC is made up of four German shaft-sinking companies.

Before excavation could be started, the entire Blairmore stratum had to be consolidated over an area extending some 50 foot around the center of the shaft area. This was accomplished by sinking 58 freeze pipes, 250 feet long, in a circle around the shaft and running through them a lithium chloride brine at —58 degrees Fahrenheit.

Freezing the area took almost a year, but when workmen began penetration of the Blairmore last fall it was solidly frozen at —50 degrees. Actual shaft sinking was accomplished with pavement break-

ers. Workmen went down five feet at a time, installing a ring of tubbing every five feet. Each ring is made up of 11 4-ton segments, each about 5 by 5 feet, and there are 76 of them, running from the 1130-foot level to 1488 feet.

To avoid possible water seepage at either end of the long tubular lining, special "sealing" rings were installed. The final seal between the ring and the wall of the shaft is accomplished by "pikotage," a technique employing wedges of specially imported Nicaraguan pitch-pine of various sizes and shapes. These are driven into the void until a sharp steel spike cannot be forced into the mass. Approximately 15,000 such wedges are used in each of three 55-foot sealing circles.

The potash beds are located at 3150 feet, and limestone formations in the last 1600 feet are expected to present no unusual problems. Initial production at the IMC shaft is expected during the fiscal year ending June 30, 1962.

A pilot surface plant for initial production is already virtually completed and can handle about 420,000 tons of product annually. Capacity will be more than doubled by a planned addition, construction of which is expected to be scheduled this summer.

Phosphate Profits Linked To Water Transportation

Development of facilities for water transport of the millions of tons of phosphate rocks and derivatives now moving by rail can mean more profit for the phosphate producers and lower fertilizer costs for the farmer, particularly in the Mid-West, a researcher from Battelle Memorial Institute, Columbus, Ohio, contended, speaking at the national meeting of the American Chemical Society.

Present costs of transporting phosphate are "substantially more" in many cases, he added, than the costs of mining the rock and beneficiating it into a form for use in fertilizer.

Chemical Engineers Plan Cleveland Meet May 7-10

Advances in chemical engineering in the United States and Canada will be discussed at a joint Cleveland meeting of the American Institute of Chemical Engineers and the Chemical Engineering Division of the Chemical Institute of Canada at the Sheraton-Cleveland Hotel May 7-10.

ARMOUR MAKES BID TO BECOME FIRST U.S. FERTILIZER MANUFACTURER BASIC IN THREE PRIMARY NUTRIENTS

Plans for a pilot plant and test wells for the solution mining of potash have been announced jointly by David G. Hill, president of Pittsburgh Plate Glass Company, and William Wood Prince, chairman of the board of Armour and Company.

The experimental unit will cost approximately one million dollars. Following completion of successful pilot operations, a joint company to produce muriate of potash in a large multimillion dollar commercial plant located in Canada will be formed by Armour and Company and Pittsburgh Plate Glass Company.

The drilling of the test wells has already started on property 18 miles east of Moosejaw, Sask., Canada, to tap potash deposits underlying that area. In solution mining, water is pumped into the mineral deposit, the mineral is dissolved in water and then is recovered above ground from the solution.

Armour requires large quantities of potash for use in fertilizers produced by the Armour Agricultural Chemical Co. Pittsburgh Plate Glass Company's Chemical Division has for a number of years mined common salt (sodium chloride) at depths as great as 6,800 ft. by the solution method. Common salt and the potash salt (potassium chloride) are closely related chemically.

This new method of recovering potash for fertilizer and other uses will compete with the existing rock mining process, the joint announcement said. To date, this method has been proven on a small pilot plant scale, and the operation of the Canadian pilot plant and test wells will give further information for the design of a large commercial installation.

The vast Canadian deposits of potash have received considerable attention in recent years because of the dwindling supplies of known high-grade potash deposits in the United States. Of the approximately 2,500,000 tons of potash consumed each year in North America, agriculture uses about 91 per cent.

Armour Agricultural Chemical Company operates a nitrogen plant in Crystal City, Mo., and has begun construction of another plant at Cherokee, Ala. It operates phosphate production units at Bartow and Fort Meade, Fla., and Columbia, Tenn.

WESTERN INDUSTRY ADVISORY COMMITTEE MEETS

The Western Industry Advisory Committee of the National Plant Food Institute met in San Francisco March 30 to discuss the 1961-62 program and budget for the West and Pacific Northwest. Projects of greatest interest were intensified Soil Fertility, Dealer Workshops and Soil Moisture-Fertility Relationships. From left to right around the table: William W. Clines, American Potash & Chemical Corp.; Dr. M. H. McVickar, California Chemical Company; Les Hamilton, California Chemical Company; Harold Ferguson, Balfour-Guthrie & Company, Ltd.; Charles Bourg, U. S. Steel Corp.; R. H. McGough, Collier Carbon & Chemical Corp.; Elwood Lentz, chairman, Western Phosphates, Inc.; Lawrence Roberts, Shell Chemical Company; William Price, Swift & Co.; John Hall, Potash Company of America; Ed Kitchen, U. S. Borax and Chemical Corp.; and Raoul Allstetter, National Plant Food Institute.

FAO Moves into Study Period

Moves to expand and improve usage of fertilizers and to mechanize small fishing craft in underdeveloped nations of the world were announced by the Food and Agriculture Organization of the United Nations as part of its Freedom from Hunger Campaign.

Field fertilizer trials and demonstrations and soil testing will be conducted in countries of the Near East, west Africa and northern Latin America. Cost of the program, estimated at $2,000,000 over a five year period, will be underwritten by the fertilizer industry. A total of $262,-300 already has been contributed or pledged for the first year's work, according to Dr. Frank W. Parker, assistant director-general and head of F.A.O.'s technical department. Representatives of the fertilizer industry last July asked the U.N. agency to undertake the program and, with the F.A.O., agreed that the budget for the first year should be $350,000.

Prospective mechanization of small fishing craft in underdeveloped nations stems from an offer by Outboard Marine Corp. of Waukegan, Ill., to supply outboard motors for this purpose, which the F.A.O. accepted. Outboard Marine's offer will be limited only by the number of programs which F.A.O. can develop. It is expected to involve several hundred engines annually over a five-year period.

Need to Encourage Federal Research Support

Federal support for agricultural research will not be provided in anything like the amount required unless entirely new action is taken, a speaker told the National Peanut Council's annual convention.

Wm. Rhea Blake, executive vice president of the National Cotton Council, emphasized that this action should satisfy five demands:

(1) Inspire confidence in what agricultural research can do, (2) concentrate attention on the big and important problems of farmers, (3) work realistically toward expanded markets, (4) promote effectiveness of agricultural research, and (5) command the respect of Congress.

Mr. Blake called upon his listeners to: encourage grassroots support of research, support research directly to the greatest extent possible, and encourage and support public research agencies.

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BOOKS

"Plant Analysis and Fertilizer" edited by: Walter Reuther, Professor of Horticulture and Chairman, Department of Horticulture, University of California, Riverside, California.

This volume contains the proceedings of the Third Colloquium on Plant Analysis and Fertilizer Problems held at Montreal, Canada, in August, 1959, and was sponsored by the American Potash Institute, Inc. The symposium consists of approximately thirty papers; many of the authors are leading authorities on mineral nutrition and fertilization of crop plants and the development and use of plant analysis as a research tool. Other authorities have made significant contributions to the application of plant analysis techniques for diagnosing deficiencies and improving the efficiency of fertilization practice on commercial crop production.

CF Staff-Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

	March		February		Oct.-Dec. Quarter		July-December		January-June		YEAR (July-June)	
STATE	1961	1960	1961	1960	1960	1959	1960	1959	1960	1959	1959-60	1958-59
Alabama	.....	182,742*	54,510	53,245	101,830	89,701	181,587	180,959	869,240	846,309	1,050,199	1,045,560
Arkansas	60,709	68,004	23,548	22,095	19,029	17,011	61,634	58,714	303,835	289,363	362,548	353,130
Georgia	72,263	83,047	35,094	32,254	181,314	163,516	313,241	299,194	1,102,220	1,130,998	1,401,414	1,425,749
Kentucky	.....	38,102*	.....	36,846*	58,468	59,541	102,192	108,734	461,786	483,820	570,520	591,380
Louisiana	44,538	47,969	17,421	17,104	39,930	31,468	73,814	66,744	224,087	201,642	290,821	265,794
Mississippi	118,348*	.....	46,462*	.....	65,307	68,869	145,632	144,374	547,221	516,917	689,797	693,288
Missouri	.....	36,618	42,887	32,353	178,350	124,202	334,657	277,708	524,336	563,055	802,044	933,090
N. Carolina	.....	226,532*	105,370	96,844	131,674	115,087	202,694	175,533	1,381,263	1,468,704	1,556,796	1,696,759
Oklahoma	21,450	11,463	9,875	5,440	33,294	26,572	94,690	72,511	72,246	64,738	144,757	133,586
S. Carolina	284,236	179,261	73,099	57,015	63,732	57,460	110,096	104,903	678,986	756,100	783,889	890,302
Tennessee	.....	62,901*	40,972	28,885	41,164	38,359	124,747	117,275	480,429	443,602	607,727	570,718
Texas	141,604	114,332	53,844	51,647	109,667	117,901	234,376	233,410	474,627	441,851	708,037	664,651
California	(reports compiled quarterly)				242,846	253,956	462,347	465,495	813,116	803,261	1,278,611	1,262,996
Virginia	(reports compiled quarterly)				93,949	72,546	168,479	141,177	591,113	618,965	732,290	779,143
Indiana	(reports compiled semi-annually)						317,372	321,956	828,164	856,316	1,150,120	1,172,657
New Hampshire	(reports compiled semi-annually)						.....	3,694*	14,488	16,143	18,182	20,889
TOTAL	624,800	540,694	456,620	396,882	1,360,554	1,236,189	2,927,558	2,768,687	9,367,157	9,513,181	12,147,752	12,499,692

..... (not yet reported) * Omitted from column total to allow comparison with same period of current year.

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Capacity	2½ Ton
With Body Extension	19 in. 4 Ton
Spread Pattern	Approx. 45 Ft.
Spread Capacity Pr. Hr.	30-60 Acres
Field Speeds	
6 M.P.H.	30 Acres Pr. Hr.
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CALIFORNIA (from page 58)

nutrient panel, which consisted of Randy Keim, Wilson & Geo. Meyer & Company, San Francisco, and Drs. Thomas Embleton, John Lingle, Carl Hansen, Kay Uriu, and James Cook—all of the University of California.

The nitrogen panel was moderated by R. L. Luckhardt, Collier Carbon and Chemical Corporation, Los Angeles. Participating were Dr. William E. Martin, University of California, Davis; John Pryor, John Pryor Company, Salinas; J. W. Chapman, Fresno Agricultural Chemical Company, Fresno; D. W. Galbraith, Agriform Chemical Company, Woodland; and Howard H. Hawkins, Golden State Plant Food Company, Glendora.

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June 22-29 — Design of experiments in the chemical and processing industries, 7 days, $175. Sample Size Determination, Review of Analysis of Variance, Sampling and Nested Designs, Completely Randomized and Randomized Block Designs, Incomplete Block Designs, Factorial Experiments, Orthogonality, Confounding, Fractional Factorials, Multiple Regression, Response Surfaces, and Evolutionary Operation.

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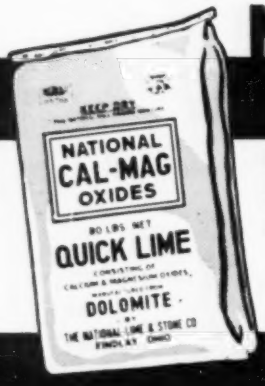

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Superior for Dehydrating, Neutralizing, and Curing factors in the preparation of effective fertilizers.

PROMPT SHIPMENTS
Three railroads serve our Carey, Ohio, plant — assuring prompt delivery — everywhere.

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We Also Produce
DOLOMITIC HYDRATED LIME (165 TNP) and KILN DRIED RAW DOLOMITE (107 TNP)
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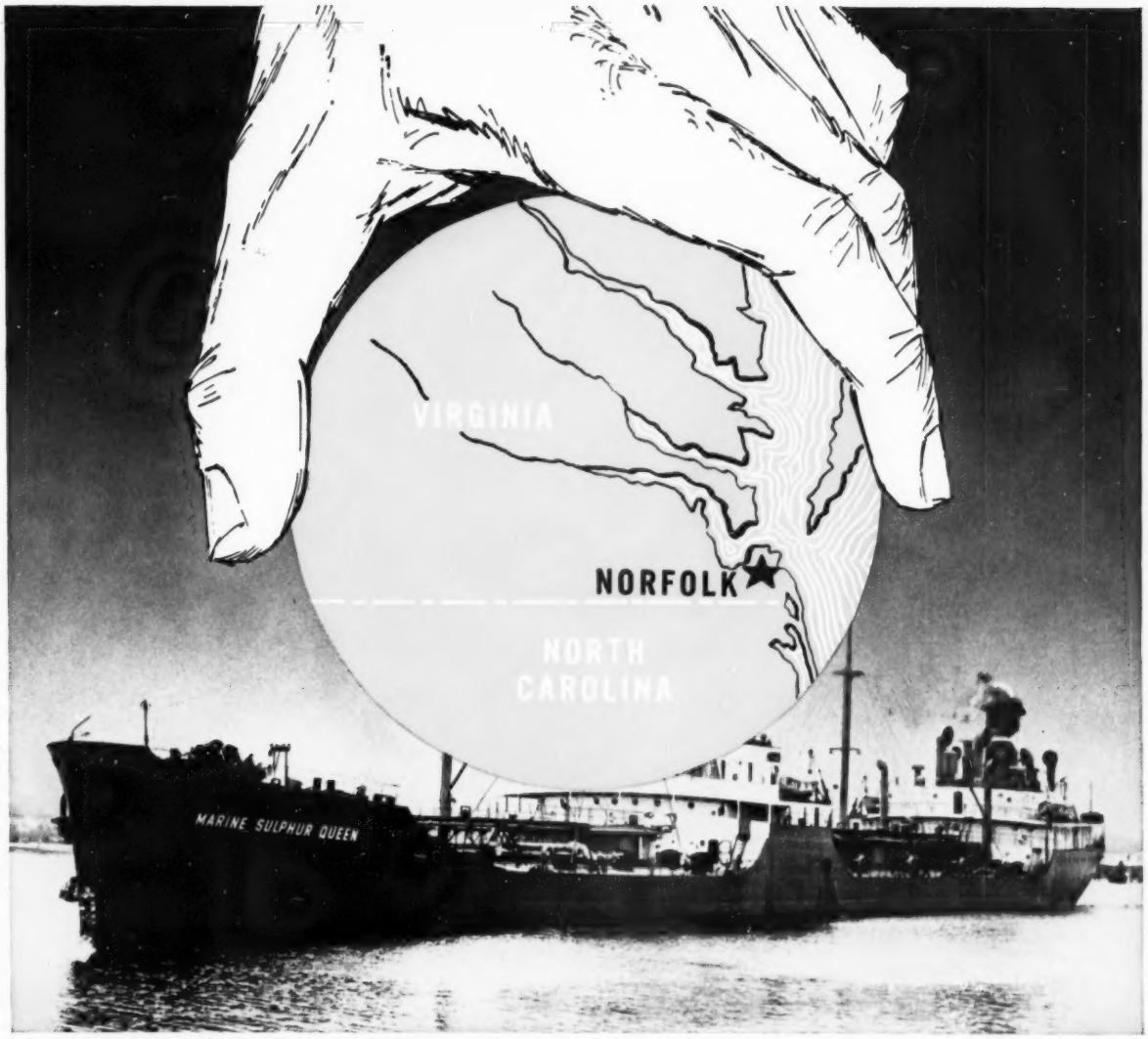
The NATIONAL LIME and STONE CO.
General Offices • • • • • FINDLAY, OHIO



add NORFOLK, VIRGINIA... to the growing list of TGS local distribution terminals for MOLTEN SULPHUR.

And how does Norfolk keep its 20,000 gross ton storage capacity stocked well ahead of demand?

By our new 15,000 ton tanker, the Marine Sulphur Queen, which on a 10 to 12 hour turn around schedule takes on cargo at our new large main supply terminal at Beaumont, Texas. From Norfolk we are supplying Mid-Atlantic plants by tank car and tank trucks.

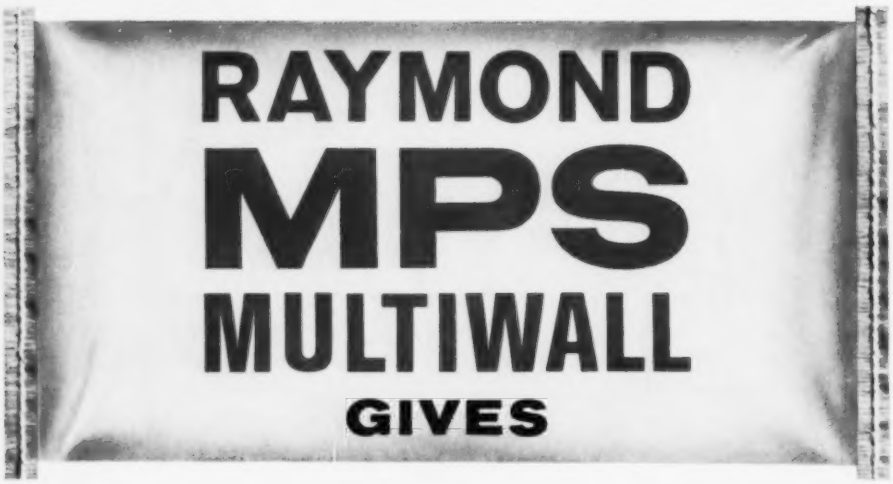
As part of a broadening program of molten sulphur deliveries, TGS is now operating several large distribution terminals located in major sulphur consuming areas.

Carteret—molten • Cincinnati—molten
Norfolk—molten, solid • Tampa—molten, solid
Other terminals are in the planning stage.

TEXAS GULF SULPHUR COMPANY
75 East 45th Street, New York 17, N. Y.
811 Rusk Avenue, Houston 2, Texas
Sulphur Producing Units:
NEWGULF, TEXAS • MOSS BLUFF, TEXAS • FANNETT, TEXAS
SPINDLETOP, TEXAS • WORLAND, WYO. • OKOTOKS, ALBERTA, CANADA

(PHOTO): The MARINE SULPHUR QUEEN heading into Norfolk.

NEW



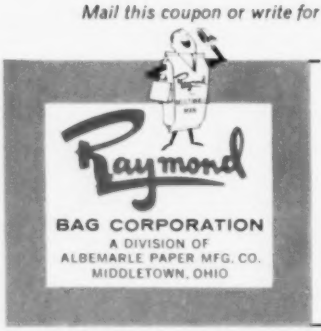
COMPLETE

MOISTURE PROTECTION

For the first time, the protection of polyethylene and the strength of rugged multiwall have been successfully combined to give **complete** moisture protection in the packaging and shipping of hygroscopic and other "difficult-to-package" products ...plus, elimination of many corrosion and contamination problems. The Raymond flexible MPS Multiwall sack can cut your costs up to 50% or more by replacing costlier, space-consuming fibre drums and other rigid-type containers. This process utilizes a **seamless** polyethylene tube integrated with the multiwall... then sewn and heat-sealed above the sewline to give **perfect sealing**...keeps product quality constant from packing through final use.

The Raymond MPS (Multiwall Perfect Seal) shipping sack has already met the critical requirements of storing and shipping such diverse products as milk replacers, refractory cements, plastic resins, anhydrous sodium bisulphite, and others. Potential applications are seen for **any product** in **any field** that requires protection from or retention of moisture. Let Raymond's experienced packaging engineers work with you to put your "difficult-to-package" products in economical, rugged multiwall... you may well realize substantial savings in storage, freight costs, and ease of handling, as well as drastic reductions in original package costs.

Mail this coupon or write for full details on this important packaging development.



Raymond Bag Corporation • Middletown, Ohio

Tell me more about the new Raymond MPS Bag.

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Title_____

Company_____

Address_____

City_____ Zone___ State_____

New York, Chicago, Kansas City, Baltimore, Louisville, Atlanta